FOR A

## FLORA

# OF THE MALAYAN PENINSULA

BY

GEORGE KING, K.C.I.E., LL.D., F.R.S.,
LATE SUPERINTENDENT OF THE ROYAL BOTANIC GARDEN, CALCUTTA.

#### CALYCIFLORÆ

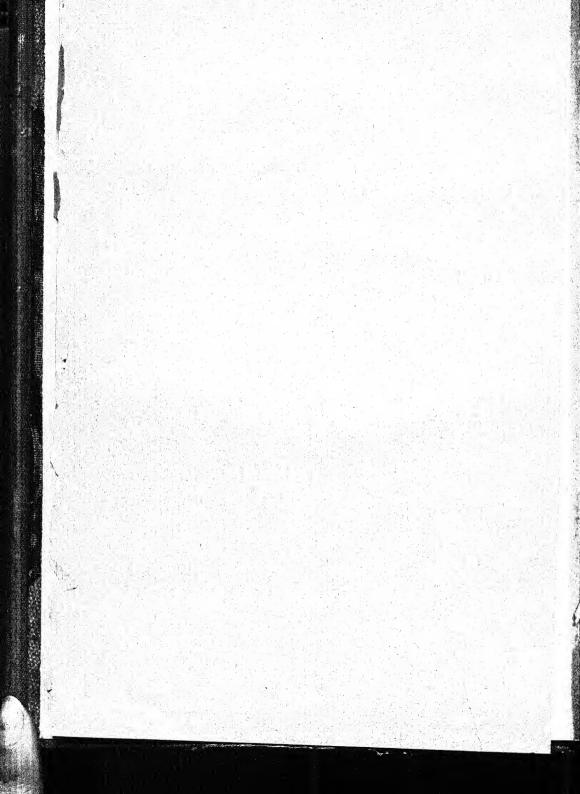
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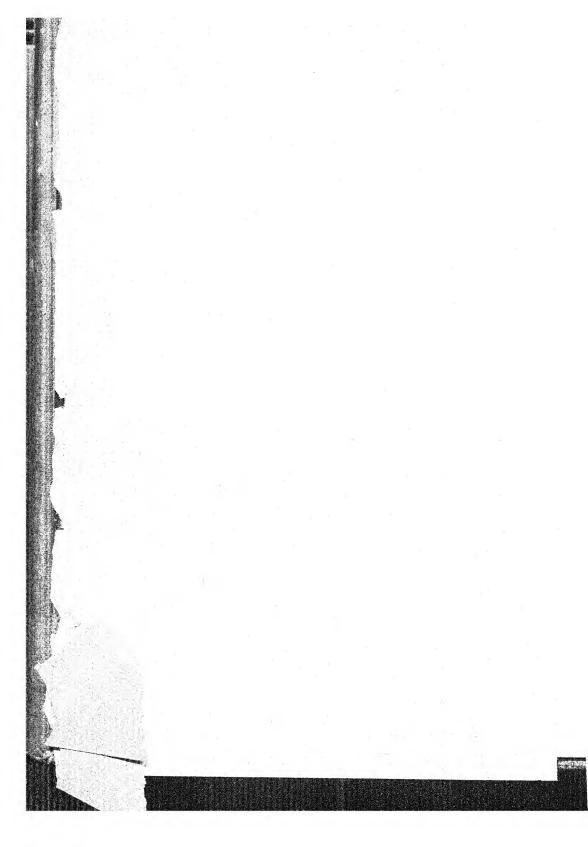
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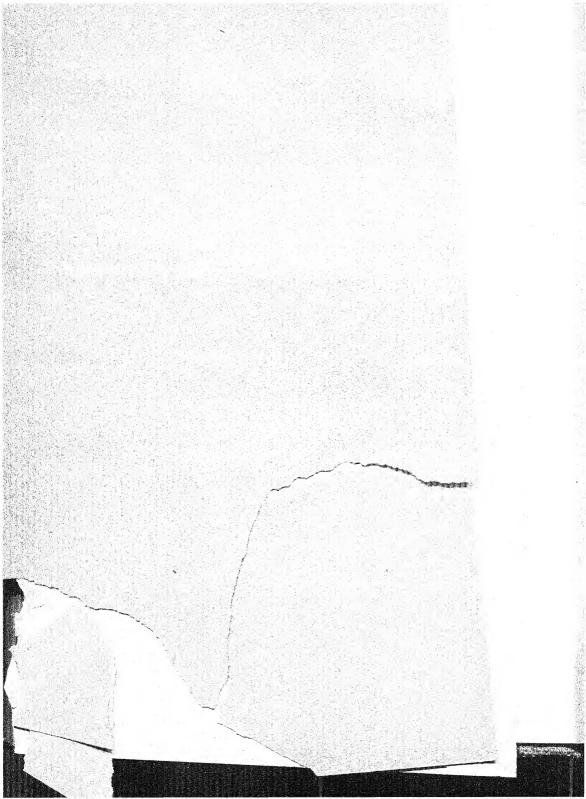
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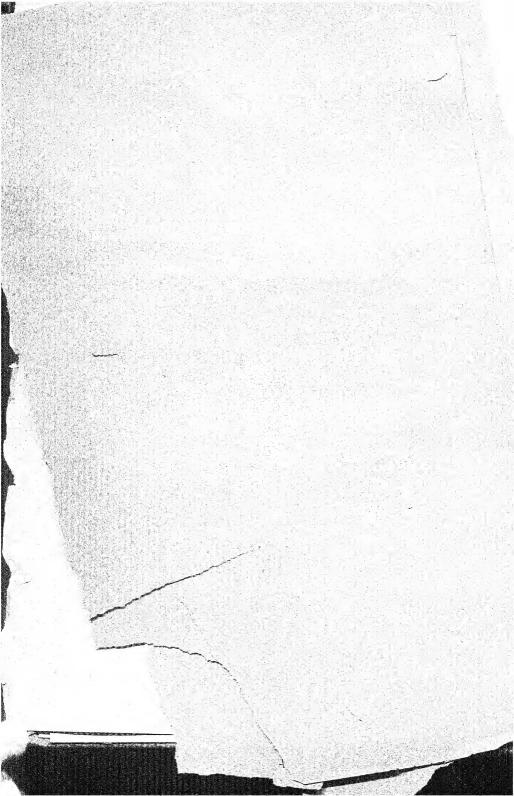
The papers contained in this volume originally appeared, like their predecessors, in the Journal of the Asiatic Society of Bengal. For the convenience of Botanists I had separate copies of each of these papers printed off as it appeared, and these are now issued as a volume dealing with the Calyciflora as its two predecessors dealt respectively with Thalamiflora and Disciflora. Each page of the volume bears two numbers. The one at the top of the page is that of the volume of the Journal in which the paper originally appeared. This number is not referred to in the Index, but it is the one which ought to be used by any one quoting this work. The numbers at the bottom of the pages (which run continuously) are those used in the index.

The dates of the publication of the five papers included in the present volume are as follows:—

No. 9, pages 1 to 344, Journ. As. Society, Bengal,	No.	I,	1897.
,, 10, ,, 345 to 408, ,, ,, ,,	No.	Ι,	1898.
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,, 12, ,, 496 to 572, ,, ,, ,,	No.	ī,	1901.
,, 13, ,, 573 to 608, ,, ,,	No.	Ι,	1902-

The order Leguminosæ was written by my friend and colleague Dr. D. Prain, and the genus Sonerita (N.O. Melastomaceæ) was done in collaboration with my friend Dr. O. Stapf, of the Kew Herbarium. The rest of the book is my own work.

It may be useful to repeat that, throughout this work, the length, 19 for a leaf is that of the blade only, the measurements of the 18 any) being given separately; and that the breadth given for a lea 192 of its broadest part.



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FOR A

#### FLORA OF THE MALAYAN PENINSULA

IN

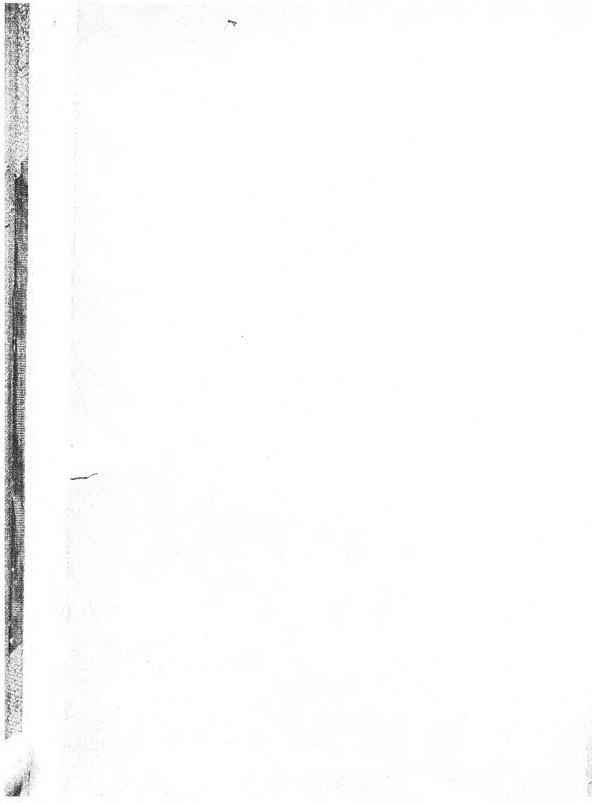
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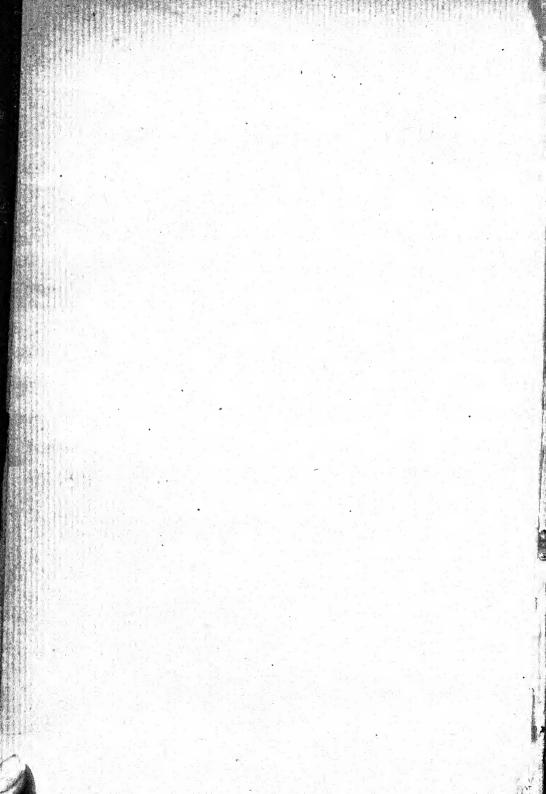
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Materials for a Flora of the Malayan Peninsula.—By George King, LL.D., F.R.S., C.I.E., Superintendent of the Royal Botanic Garden, Calcutta.

#### No. 9.

With the last part of these Materials the account of the Discifloræ of the Malayan Peninsula was concluded; and in the present part that of the Calycifloræ is begun. My progress has (owing to the press of official and of other work) been even slower than I anticipated when I began the publication of these Materials now more than seven years ago. I therefore invoked the aid of my excellent friend and colleague Dr. D. Prain, and he, in response to my appeal, generously undertook the elaboration of the important family of Leguminosæ which forms so large a portion of the present paper. It is hoped that one more contribution similar in size to the present one will suffice to complete the account of the Calycifloræ, and so to bring the whole series about half way towards completion.

# Order XXXVII. CONNARACEÆ.

Erect or climbing shrubs or trees. Leaves alternate, exstipulate, I-3-foliolate or unequally-pinnate; leaflets quite entire. Flowers in racemes panicles or cymes, regular or subregular, usually bisexual. Calyx 5-lobed or -partite, usually persistent, imbricate or valvate. Petals

5, usually narrow, free or slightly cohering, very rarely valvate. Stamens perigynous or hypogynous, sometimes declinate, 5 or 10, those opposite the petals often shorter and imperfect; filaments often connate at the base. Disc 0 or small, annular or incomplete. Pistils 5, rarely 1-3 or 6-7, ovoid, hirsute, 1-celled; styles subulate or filiform, stigmas capitellate, simple or 2-lobed; ovules 2, collateral, ascending, orthotropous. Fruit usually of 1, rarely 2-3, sessile or stalked, 1- rarely 2-seeded follicles. Seed erect, usually arillate, testa thick, usually more or less covered by an arillus which is often very thin; cotyledons fleshy in the exalbuminous, leafy in the albuminous seeds; radicle superior, rarely ventral.—Distrib. 14 genera, all tropical.

Seeds exalbuminous, arillate.

Pistils solitary.

Leaves pinnate, leaflets 3 to 11; trees or scandent

\*\*\* Leaflet solitary, small trees or shrubs, never scandent .2. Ellipanthus.

Pistils 5 but usually only 1 perfect: leaves pinnate, (leaflet solitary in one species of Rourea).

Flower-pedicels ebracteolate: follicle curved; lobes of calyx persistent, slightly accrescent, imbricate and

forming a cup at the base Flower-pedicels with persistent bracteoles at their bases, follicle not curved; calyx-lobes persistent, but

neither accrescent nor imbricate

Pistils 2 to 5, perfect. Calyx imbricate; follicles rugose, laminate or tubercled 5. AGELEA.

Calyx valvate; follicles neither rugose laminate nor tubercled Seeds albuminous, pistils 5 to 7, follicles 1 to 3, arillus thin 7. CNESTIS.

... 1. CONNARUS.

3. ROUREA.

ROUBEOPSIS.

... 6. TÆNIOCHLÆNA.

### 1. Connarus, Linn.

Trees or (usually scandent) shrubs. Leaves unequally pinnate; leaflets 5, rarely 3 or more, quite entire. Panicles axillary and terminal, branched. Flowers small. Sepals 5, deciduous or persistent and clasping the pedicel of the capsule but not accrescent, imbricate. Petals 5, linear or slightly dilated upwards. Stamens 10, 5 shorter and sometimes without anthers. Ovary 1, densely pubescent, style slender, stigma capitellate. Capsule oblique, stipitate, inflated, broader upwards; valves glabrous or pubescent within. Seeds arillate, testa shining, albumen 0; cotyledous amygdaloid.—DISTRIB. Species about 80, all tropical.

Petals minute, much shorter than the sepals ... ... 1. C. Maingayi. Petals longer than the sepals.

Under surfaces of the leaflets and the follicles externally densely rusty-pubescent, upper surfaces of leaflets sparsely pubescent ...

2. C. ferrugineus.

Under surfaces of leaflets pubescent, upper surfaces and adult follicles externally glabrous 3. C. semidecandrus. Both surfaces of the leaflets quite glabrous. Leaflets ovate-lanceolate or elliptic-lanceolate, acuminate, 2 to 4 in. long. Follicles sub-cylindric, tapering at the ends, not compressed, minutely sericeous inside ... ... 4. C. oligophyllus. Follicles compressed, sparsely stellate-hairy inside .. 5. C. hebephyllus. Leaflets broadly ovate with very rounded bases; petals pubescent; follicles 1.5 in. long, pubescent inside ... 6. C. nicobaricus. Leaflets elliptic-oblong or elliptic, 3 to 12 in. long; petals glabrous. Main nerves of leaves 6 or 7 pairs; follicles 1.25 to 1.4 in. long, sericeous inside ... 7. C. gibbosus. Main nerves of leaves 9 or 10 pairs; follicles 1.5 to 1.75 in. long, sericeous inside ... 8. C. grandis. Main nerves of leaves 5 pairs; fellicles 2.5 in. long, pubescent inside ... ... 9. C. ellipticus.

1. Connarus Maingayi, Hook. fil. Fl. Br. Ind. II, 53. A small tree; young branches minutely rusty-tomentose. Leaves 6 to 8 in. long. their rachises densely and minutely tomentose; leaflets 7 to 9, coriaceous, elliptic-oblong, obtusely and shortly acuminate, the base rounded or sub-cuneate, both surfaces distinctly reticulate when dry, the upper glabrous, the lower paler and sparsely adpressed-pubescent, the midrib tomentose; main nerves 7 to 11 pairs, spreading, faint; length 2.25 to 3.25 in., breadth 1 to 1.35 in., petiolules 1 to 15 in. Panicles axillary and terminal, longer than the leaves, densely and minutely rustytomentose; the branches short, spicate, with the flowers clustered near the apices. Flowers about 15 in. long, and the same in diameter, on pedicels shorter than themselves. Sepals oblong, laterally inflexed at the apex, hoary-pubescent outside, glabrous inside, connivent. Petals minute, much shorter than the sepals and shorter than the stamens, palepubescent in front. Stamens 10; the anthers almost sessile, broadly ovate, glabrous. Pistil solitary, the ovary sericeous like the disc, the style short and stout. Fruit not seen.

Perak; King's Collector, No. 3106.

This is readily distinguished from every Connarus described here by its very minute petals. In leaves it approaches C. oligophyllus, but is distinguished from that by its pinnate nervation.

2. Connarus ferrugineus, Jack in Mal. Misc. 2, VII, 37. A sarmentose shrub or powerful woody climber as much as 80 feet long; young branches, petioles, rachises, under-surfaces of leaves and inflorescence densely rusty-tomentose. Leaves 8 to 16 in. long; leaflets 5 to 11, coriaceous, oblong-lanceolate or oblong-oblanceolate, shortly acumi-

nate, narrowed in the lower fourth to the rounded or sub-cordate base; upper surface rugose and, even when adult, clothed with sparse thin hairs; when old glabrous, the midrib and nerves depressed and tomentose; under-surface rusty-tomentose; main nerves 6 or 7 pairs, oblique, curved, prominent beneath; length 3 to 6 in., breadth 1.25 to 2 in., petiolules 1 to 15 in. Panicles terminal, shorter or longer than the leaves; the branches rather short, stout. Flowers crowded, ·3 in. long, on pedicels much shorter than themselves. Sepals oblongovate, tomentose outside, glabrous inside. Petals linear-oblong, glabrous. Stamens 10, alternately long and short, the filaments glabrous. Ovary oblong, tomentose, style short. Follicle obovoid-oblong, shortly apiculate, tapering to the base, red when ripe, densely rusty-tomentose, 1.75 to 2.25 in. long and .8 to 1.25 in. broad; pericarp woody, densely sericeous inside. Seed narrowly oblong, I in. long and 6 in. broad, black, shining, with a basal incomplete arillus 5 in. long. Planchon in Linnæa, Vol. XXIII, 429; Hook. fil. Fl. Br. Ind. II, 51. Tricholobus ferrugineus, Blume Mus. Bot. Lugd. Bat. 1. 237. Connaracea, Wall. Cat. 8530.

In all the provinces except the Andaman and Nicobar Islands.—DISTRIB. Sumatra.

I see no character to separate Blume's genus Tricholobus from Connarus, and I therefore follow Sir Joseph Hooker in adhering to Jack's name for this plant.

3. Connarus semidecandrus, Jack in Mal. Misc. 2, VII, 39. A

sarmentose or often scandent shrub; young branches decidnously puberulous. Leaves 6 to 9 in. long, their rachises and the under-surfaces of the leaflets with their petiolules pubescent or puberulous: leaflets 5 to 7, thinly coriaceous, oblong to elliptic-lanceolate, shortly caudateacuminate, the base cuneate or rounded; upper surface quite glabrous; the lower reticulate, the pubescence often deciduous with age; main nerves 6 or 7 pairs, prominent on the lower surface, spreading but curving upwards, the lower pair very oblique; length 2.5 to 4.5 in., breadth '9 to 2.5 in., petiolules 15 in Panicles axillary and terminal, longer than the leaves, much branched, densely and minutely rusty-tomentose. Flowers rather crowded, 2 in. long, on pedicels shorter than themselves. Sepals oblong, obtuse, concave, pubescent outside, shorter than the glabrous linear-oblong petals. Stamens 10, in two rows, one row very short, the other with its filaments dilated at their bases and as long as Peta the petals. Pistil single, shorter than the stamens, the ovary hairy; als he style short, stout, pubescent; stigma sub-capitate. Follicles falcate, der void, compressed, with a short abrupt apical point, narrowed to a try at the base, at first rusty-pubescent, afterwards glabrous, obliquely about 75 to 9 in long and 5 in broad; pericarp thin, sparsely stalk. striate.

sericeous internally. Seed with a short basal arillus. Hook. fil. Fl. Br. Ind. II, 52; Kurz For. Flora Burma, II, 326. Connarus floribundus, Wall. Cat. 8543 (in part), 8541, B.

In all the provinces except the Nicobars and Andamans.—DISTRIB. Sumatra.

This species is easily distinguished when in fruit by the small size of its follicles. But, while in flower, it is not easy to separate it from C. gibbosus, Wall.; the only distinctions that I can find being that, in the latter, the follicles are larger than in this, and that the leaflets are quite glabrous on both surfaces.

CONNARUS OLIGOPHYLLUS, Wall. ex Planch. in Linnæa, XXIII. 427. Scandent, glabrous except the inflorescence. Leaves 6 to 8 in. long: leaflets 3 to 5, coriaceous, elliptic-lanceolate to elliptic-oblong. sub-acute or shortly and bluntly acuminate, the base cuneate or rounded: upper surface shining; the lower paler, dull; main nerves 4 or 5 pairs. ascending (especially the lower 2 pairs), curved, slightly prominent on the lower surface, very faint on the upper; length 2.25 to 4 in., breadth 1 to 2 in., petiolules .25 to .3 in. Panicles terminal and longer than the leaves or lateral and shorter, sub-pyramidal, much branched, minutely rustv-pubescent, many-flowered. Flowers 35 in. long, sub-sessile or on short pedicels. Sepals ovate-lanceolate, acute, much shorter than the oblong obtuse puberulous petals; perfect ovary 1, flask-shaped, puberulous. Follicle nearly straight, not compressed, cylindric, tapering to each end, glabrous and vertically striate (when dry) outside, the pericarp coriaceous, minutely sericeous internally, 1.5 to 2 in. long and .75 in. in diam. at the middle. Seed shining, black. Hook. fil. Fl. Br. Ind. II. 53. Connaracea, Wall. Cat. 8542 (in part) and 8539 D. (in part).

Penang; Porter. Perak; Wray, No. 1942. King's Collector, Nos. 5232, 5613, 7804, 8335, 8432. Scortechini, No. 1057. Singapore; Ridley, No. 5904. Malacca; Maingay, Nos. 506, 508/2, 513.

5. Connarus hebephyllus, n. spec. King. A powerful climber; young branches deciduously rusty-pubescent; the bark pale, sparsely lenticellate. Leaves 6 to 12 in. long, their rachises glabrous; lentlets coriaceous, ovate-lanceolate, acuminate, the base rounded or slightly cuneate; both surfaces glabrous, dull, the lower pale and faintly reticulate; main nerves 6 or 7 pairs, spreading, curving upwards; length 2 to 4 in., breadth 75 to 135 in.; petiolules about 2 in., rugulose, glabrous, pale. Panicles terminal and axillary, shorter than the leaves in flower, as long as or longer than them in fruit; the branches short, densely rusty-tomentose. Flower-buds obovate, on short pedicels. Calyx densely rusty-tomentose outside. Petals glabrous. Stamens 5 long and 5 minute. Follicles when young rusty-tomentose, when ripe

glabrous externally except along the suture, broadly oblong, blunt at both ends, somewhat compressed, obliquely striate, attenuated to a very short grooved pseudo-stalk, rosy-red when ripe, sparsely stellate-hairy inside; length 1.25 in., breadth .85 in.; the pericarp thin, coriaceous, glabrous inside. Seed narrowly oblong, blunt, with a short arillus at its base.

Perak; Wray, No. 1858. King's Collector, Nos. 5586, 6517, 7519.

6. Connarus nicobaricus, King n. spec. Scandent, woody, all parts except the inflorescence glabrous; young branches with pale smooth bark. Leaves 8 to 10 in. long; leaflets thinly coriaceous, 3 to 5, broadly ovate with a very short blunt apical point, the base broad and rounded; upper surface slightly shining, the lower duller and paler; main nerves 6 or 7 pairs, faint, curving upwards; length of lateral leaflets 2.75 to 4.5 in., breadth 1.5 to 2.75 in.; petiolules about 25 in., the terminal leaflet larger. Panicles terminal (probably also axillary), nearly as long as the leaves, rusty-pubescent, the branches sub-erect. Flowers crowded near the ends of the branchlets, 35 in. long, on pedicels much shorter than themselves. Calyx-segments ovate, tomentose outside, glabrous inside, about one-fourth as long as the corolla. Petals linear, pubescent on both surfaces. Stamens 10, in two rows, the longer row much shorter than the style and petals; filaments sparsely pubescent, swollen near the base. Pistil as long as the petals; the ovary broadly ovoid, tomentose; style sparsely pubescent. Stigma sub-capitate. Follicle broad, sub-compressed, obtuse, glabrous, faintly striate longitudinally, 1.5 in. long, and nearly 1 in. broad, pubescent inside. Nicobar Islands; King's Collectors.

Allied to C. gibbosus, Wall., but with pubescent petals and larger follicles which are pubescent inside.

7. Connarus gibbosus, Wall. Cat. 8541 (in part). A large semiscandent shrub; young branches decidnously rusty-puberulous. Leaves6 to 9 in. long, quite glabrous; leaflets 3 to 5, thinly coriaceous, elliptic or elliptic-oblong, very shortly and obtusely acuminate, the base rounded; both surfaces shining, the lower reticulate; main nerves 6 or 7 pairs, spreading but curving upwards, the lower pairs very oblique, slightly prominent on the lower surface; length 3 to 5 in., breadth 1.25 to 2.5 in., petiolules 2 to 3 in. Panicles axillary and terminal, shorter than or as long as the leaves, many-branched, rusty-pubescent. Flowers rather crowded on the short ultimate branchlets, 25 in. long, on pedicels shorter than themselves. Sepals and petals as in C. semidecandrus. Stamens 10, the one row only slightly shorter than the other. Pistil longer than the stamens and petals; the ovary ovate-rotund, rusty-tomentose, the style pubescent; stigma sub-capitate. Follicles

sub-rhomboidal, compressed, with a short stout apical point, glabrous, obliquely striate; pericarp leathery inside, sericeous, 1.25 to 1.4 in. long, and about 1 in. broad, the stalk 4 in long. Seed nearly 1 in. long, oblong, blunt at both ends, black, with an arillus obliquely covering its lower half. Hook. fil. Fl. Br. Ind. II, 52; Kurz For. Flora Burma, II, 326.

The Andaman Islands. - DISTRIB. Burma.

This may be distinguished from C. semidecandrus by its larger follicles, and larger seeds much more extensively covered by arillus. The inner surface of the pericarp in this is glabrous; in C. semidecandrus it is sparsely sericeous.

8. Connarus grandis, Jack in Mal. Misc. 2, VII, 40. Scandent, all parts except the inflorescence quite glabrous. Leaves 9 to 12 in. long, their rachises stout; leaflets 3 to 5, very coriaceous, ellipticoblong, acute or obtusely acuminate, the base rounded or sub-cuneate; both surfaces, but especially the upper, shining, the lower reticulate when dry; main nerves 9 or 10 pairs, oblique, faint; length 4 to 12 in., breadth 1.5 to 4 in.; petiolules of the lateral leaflets about 5 in., of the terminal 75 in. Panicles often as long as the leaves, terminal or axillary, spreading, with a few spike-like branches, rusty-tomentose. Flowers sessile, 25 in. long Sepals tomentose outside, linear-oblong, obtuse. Petals twice as long, linear, dilated upwards, glabrescent. Filaments puberulous. Follicles obliquely ovoid, sub-rhomboidal, compressed, glabrous, slightly and obliquely rugulose when dry, tapering to a short pseudo-stalk, 1.5 to 1.75 in. long, and about 1 in. broad; pericarp woody, sericeous inside. Planchon in Linnæa, XXIII, 429; Hook. fil. Fl. Br. Ind. II, 53. C. Wallichii, Planch. l. c. 426; Kurz For. Flora Burma, L 328. Connaracea, Wall. Cat., 8538 A. B. (in part).

In all the provinces except the Nicobars and Andamans.

9. Connarus ellipticus, King n. spec. Scandent; young branches deciduously rusty-pubescent, the bark dark and polished. Leaves 8 to 15 in. long, everywhere glabrous; leaflets coriaceous, 3 to 5, ellipticoblong to elliptic, acute or shortly acuminate, the base rounded or subcuneate, upper surface very shining when dry; the lower paler, reticulate and less shining; main nerves 5 pairs, oblique, rather prominent beneath; length 4.5 to 7 in., breadth 2 to 3 in.; petiolules 2 to 3 in., rugulose, pale. Panicles axillary and shorter, or terminal and longer than the leaves, minutely rusty-pubescent, the branches obliquely spreading, the ultimate branchlets short. Flowers 25 in. long, on pedicels slightly shorter than themselves. Segments of the calyx ovatelanceolate, acute, rusty-tomentose outside, glabrescent inside, about as long as the pistil and half as long as the linear acute glabrous petals. Stamens 5 perfect nearly as long as the petals, and 5 abortive (without

anthers) shorter than the pistil; filaments glabrescent or glabrous, those of the perfect stamens dilated at the base. Ovary pubescent, style glabrous, stigma discoid-capitate. Follicles broad, obliquely subrhomboid, tapered to the base, the dorsal suture straight and ending in a conical point, the ventral compressed and widely curved, glabrous, red when ripe, 2.5 in. long and 1.5 in. broad; pericarp woody, adpressed-pubescent on its inner surface. Seed oblong, flat; the testa black, half covered by a thin basal arillus. Erythrostigma ellipticum, Zoll. in Tijdsch. Ned. Ind. XIV, 174.

Singapore; Ridley, No. 1380. Perak; King's Collectors, Nos. 4090, 4943, 5958, 7480, 8435. Wray; Nos. 1831, 2870, 2873; Scortechini, No. 1689. Penang; Curtis.

There is a specimen in the Calcutta Herbarium collected by Kurz in the Buitenzorg garden which exactly agrees with this. That specimen is named Erythrostigma ellipticum Zoll.; and it is on the strength of this identification of Kurz's that I have included this synonym here. For Zollinger (who refers the genus Erythrostigma to Anacardiaceæ) defines his three species (I. c.) E. ellipticum, E. obliquum and E. villosum so briefly and imperfectly, that it is quite impossible, from his descriptions alone, to identify any of them.

#### 2. ELLIPANTHUS, Hook. f.

Trees or erect shrubs. Leaves with 1 leaflet, quite entire. Racemes or cymes axillary, short. Flowers hermaphrodite or polygamous. Sepals 5, not enlarged in fruit, sub-erect, valvate. Petals 5, longer than the sepals, oblong-lanceolate, densely pubescent. Stamens 10, 5 shorter without anthers; filaments short, subulate, connate at the base. Ovary 1, pubescent; style short. Follicle stalked, oblique, velvetty; valves glabrous within. Seed arillate, albumen 0; cotyledons plano-convex.—Distrib. 12 species; Malayan Peninsula and Islands.

Both surfaces of leaves quite glabrous.

Leaflet narrowly elliptic-oblong, tapering to each end; follicles '5 in. long ... ... ... ... ... ... 1. E. Scortechinii.

Leaflet elliptic-ovate to elliptic; follicle 1 in. long ... 2. E. calophyllus.

Under surfaces of leaves hairy.

Leaflet oblong-lanceolate, 2.5 to 3.5 in. long; flowers in short panicles ... ... ... 3. E. Curtisii.

Leaflets ovate- or oblong-elliptic to elliptic, 4 to 6 in long.

Flowers in racemes, follicle with a pseudo-stalk only '2 in. long ... ... ... ... 4. E. Griffithii.

Flowers in dense capituloid cymes; follicle gibbous at

1. Ellipanthus Scortechinii, King n. spec. A small tree; young branches with pale cinereous bark, pubescent. Leaflet thinly coriaceous, narrowly elliptic-oblong, tapering from the middle to either end, the

the base on one side, its pseudo-stalk about 1 in. long .. 5. E. gibbosus.

apex caudate-acuminate; both surfaces glabrous, the upper shining; the lower dull, minutely reticulate; main nerves 4 pairs, curved, ascending, prominent on the lower surface; length 4.5 to 7 in., breadth 1.25 to 2 in., petiole 1 to 15 in. Cymes axillary, very short, tawny-tomentose. Calyx thick; the lobes deep, ovate, obtuse, cinereous-tomentose. Petals slightly longer than the calyx, membranous. Follicles cinereous-tomentose, obliquely elliptic, sub-compressed, grooved along the suture, almost straight, the apex rather blunt with an abrupt small apiculus, the base slightly and suddenly contracted into a short stout pseudo-stalk covered by the persistent calyx; length 5 in., breadth 3 in.; pericarp thick, glabrous inside. Seed oblong with a large hilum and thin arillus.

Perak; Scortechini No. 607.

Gathered only by the late Father Scortechini whose specimens are in fruit, and from whose field notes the foregoing description of the flower has been taken.

2. ELLIPANTHUS CALOPHYLLUS, Kurz Andam. Report, Append. B. 6. A small tree; young branches slender, glabrous. Leaflet coriaceous. elliptic to elliptic-ovate, sometimes oblong-lanceolate, shortly caudateacuminate, the base rounded or slightly and abruptly cuneate; both surfaces glabrous; the upper shining when dry; the lower dull, minutely reticulate; main nerves 4 or 5 pairs, spreading, curving upwards, interarching freely; length 4.5 to 6.5 in., breadth 2 to 2.25 in.; petiole .75 to 1 in., the joint near the apex. Cymes axillary, shorter than the petioles. minutely tawny-tomentose. Flowers 3 in. long, on pedicels shorter than themselves. Calyx lobes broadly evate, sub-acute, tawny-tomentose outside, less than half as long as the linear-oblong densely velvetty obtuse petals. Stamens the 5 perfect shorter than the petals and with very pubescent filaments; the 5 abortive much shorter and more slender. anantherous. Ovary narrowly ovoid, sericeous. Style rather short, stigma sub-capitate. Follicles obovoid or ellipsoid, slightly compressed, blunt, rusty-tomentose, 1 in. long; pericarp thick, woody, glabrous within Kurz Journ. As. Soc. Beng. 1872, Pt. II, 305; For. Flora Burma I.

ook. fil. Fl. Br. Ind. II, 55.

ndaman Islands; Kurz, King's Collectors.

3. Ellipanthus Curtish, King n. spec. A tree; young branches by-puberulous, the bark dark. Leaflet thinly coriaceous, oblong-lancolate, tapering to each end, the apex caudate-acuminate; upper surface glabrous, shining; the lower reticulate, sparsely pubescent, the midrib tomentose; main nerves 7 or 8 pairs, curving obliquely upwards, prominent beneath; length 2·5 to 3·5 in., breadth 8 to 1·5 in., petiole ·3 in., tomentose. Panicles axillary, branching from the base, ·5 to ·7 in. long, sericeous. Flowers ·2 in. long, on pedicels shorter than themselves. Segments of the calyx ovate-lanceolate, thick, tomentose on the outer,

glabrescent on the inner surface, less than half as long as the petals and pistil. Petals narrowly oblong, sub-acute, pubescent on the outer, glabrescent on the inner surface. The 5 fertile stamens as long as the ovary, glabrous, the anthers broadly ovate, the filaments much dilated at the base, the 5 alternate much smaller and without anthers. oblong, sericeous-tomentose, longer than the stout pubescent style; stigma capitate-discoid. Fruit unknown.

Penang; Curtis Nos. 1014, 1097.

. The nearest ally of this appears to be the imperfectly known E. Helferi, Hook, fil. from Tenasserim, of which the type is Helfer's No. 1253; but the leaves of this are much more pubescent on the lower and more shining on the upper surface. The flowers of this are moreover larger.

4. ELLIPANTHUS GRIFFITHII, Hook. fil. Fl. Br. Ind. II, 56. A small tree? Young branches slender, rusty-pubescent. Leaflet thinly coriaceous, ovate-elliptic, caudate-acuminate, the base abruptly sub-cuneate; upper surface glabrous, shining, the lower sparsely rusty-pubescent, the midrib and nerves almost tomentose; main nerves 9 or 10 pairs, spreading, interarching, prominent beneath; length 4 to 5 in., breadth 1.5 to 2 in., petiole 2 to 25 in. Racemes 25 in. long, fewflowered; calyx deeply divided into 5 ovate-lanceolate teeth, adpressed-pubescent. Follicles compressed, much curved, the apex beaked, narrowed at the base to a pseudo-stalk 2 in. long which is embraced by the persistent calyx, rufous tomentose outside, 75 in. long; the pericarp coriaceous, glabrous inside.

Mallacca; Griffith No. 1253.—DISTRIB. Borneo.

5. ELLIPANTHUS GIBBOSUS, King n. spec. A small tree; young branches slender, rusty-tomentose. Leaflet elliptic or oblong-elliptic, sometimes slightly obovate, shortly and rather abruptly caudate-acuminate, the base cuneate; upper surface quite glabrous; the lower sparsely adpressed-pubescent, the midrib densely so; main nerves 7 or 8 pairs, spreading but curved upwards, prominent on the lower surface when dry; length 4.5 to 6.5 in., breadth 1.75 to 2.75 in., petiole 5 or 6 in. long, tomentose, stout, the joint near the apex. Flowers '15 in. long, in dense many-flowered capituloid axillary cymes, sub-sessile. Calya-teeth lanceolate, tawny-tomentose externally, glabrous internally. broader than the sepals and sometimes also longer, imbricate, tomentose outside, glabrous inside. Stamens 5 or 6 fertile with broadly ovate anthers, and 5 alternate smaller and abortive; the filaments of all united by their expanded bases. Ovary villous, style about as long as the stamens, stigma discoid. Follicle narrowly oblong, compressed, the apex produced into a long conical beak; the base gibbous at one side, contracted below the gibbosity into a curved pseudo-stalk about an inch

long, everywhere pale rusty-tomentose; length of follicle and beak equal to that of the pseudo-stalk; pericarp leathery, glabrous inside. Seed arillate at the base, testa black.

Perak; very common, Scortechini, Wray, Curtis, King's Collectors.

#### 3. ROUREA, AUBL.

Scandent or sarmentose shrubs. Leaves unequally pinnate, sometimes with only one leaflet; leaflets subopposite or alternate. Racemes or panicles axillary. Flowers small; pedicels usually slender. Sepals 5, orbicular, imbricate, enlarged and clasping the base of the ripe capsule. Petals 5, usually linear-oblong. Stamens 10; filaments connate at the base. Ovaries 5, 4 usually imperfect; style slender. Follicle sessile, curved. Seed erect, arillate, exalbuminous.—Distrib. Tropics; species about 52.

Leaflets not more than 7, petiolulate, glabrous.		4
Leaves with usually a single leaflet	1.	R. anomala.
Leaves with 3 to 9, rarely 11, leaflets; inflorescence ebrac-		
teolate, or the bracteoles (if any) fugacious.		
	2.	R. acuminata.
Leaflets not glaucous on the lower surface.	- :	201 00000000000000000000000000000000000
Leaves 8 to 12 in. long; leaflets elliptic-lanceolate		
to elliptic, their main nerves 2 to 5 pairs, curving		
abruptly upwards; flowers 35 in. in diam, in racemes		
	3	R. commutata.
Leaves 3 to 7 in. long; leaflets ovate-lanceolate, their	٠.	25. 00
main nerves 4 or 5 pairs, faint, spreading; flowers 25		
	4.	R. pulchella.
Leaves 3.5 to 6 in. long; leaflets 3 rarely 5, broadly		and participates
ovate or ovate-orbicular with broad rounded bases;		
their main nerves about 4 pairs, spreading, faint;		
flower-buds globose	5.	R. humilis.
Leaflets very numerous (17 to 40), small, sessile, oblong.		To: The streets.
Leaflets shortly and bluntly acuminate, pubescent beneath	6	R. vugosa
Leaflets bifid at the apex, minutely dotted and sparsely	٠.	Lut / togodat
pubescent beneath	7.	R. parallela.
Leaflets with obtuse rounded apices.	•••	zo. pa. accesa.
Lower surface of leaflets rusty-sericeous	8.	R. fulgens.
Lower surface of leaflets minutely dotted, reticulate,	~	20. 3 000 000
	9.	B. concolor.
1 ROUBEA ANOMALA King n spec. A nowerful wood		

1. ROUREA ANOMALA, King n. spec. A powerful woody perfectly glabrous creeper. Leaves either simple or ternate; leaflets coriaceous, ovate-elliptic to broadly ovate, shortly and bluntly caudate-acuminate, the base rounded and usually broad; both surfaces shining and minutely reticulate when dry; main nerves about 6 pairs, curving upwards,

faint: length of the simple leaves and of the terminal leaflet of the ternate leaves 3.25 to 4.5 in., breadth 1.6 to 2.2 in.; petiolules about .2 in, those of the lateral leaflets shorter. Racemes slender, shorter than the leaves, in fascicles in the leaf-axils, laxly-flowered. Flowers 35 in. long, on slender pedicels of about the same length. Segments of calyx ovate-orbicular, sub-oblique, puberulous outside, their edges ciliate, only about one-third of the length of the linear-oblong glabrous petals. Stamens much shorter than the petals and than the glabrous pistils. Follicles obliquely ovoid, sub-compressed, blunt, yellowish with a red tinge when ripe, 1 in. long. Seed with a soft red arillus.

Penang; Curtis No. 504, Perak; King's Collector Nos. 804, 953, 3066, 3866, 4527, 4622, 6755, 8312, 10542, 10863. Wray, No. 3799; Scortechini.

This resembles R. simplicifolia Bl. in having both simple and compound leaves; but that is a smaller plant with puberulous inflorescence, and different follicles.

2. ROUREA ACUMINATA, Hook. fil. Fl. Br. Ind. II, 48. A powerful woody perfectly glabrous creeper often over 100 feet long; young branches glabrous, often minutely lenticellate. Leaves 3 to 9 in. long, the rachis slender; leaflets 5 to 11, thinly coriaceous, oblong, lanceolate or elliptic-oblong, sometimes somewhat obovate, abruptly shortly and bluntly caudate-acuminate, slightly narrowed to the rounded base or with broad minutely cordate base; upper surface shining, the lower dull and glaucous, both minutely reticulate when dry; main nerves about 5 pairs, very faint, spreading; length 1.5 to 2.25 in., breadth .65 to .9 in.; petiolules under 'l in., the terminal one slightly larger. Racemes very slender, lax, several from an axil. Flowers '3 in. long, on slender pedicels of about the same length. Sepals ovate-rotund, about half as long as the narrowly oblong glabrous sepals, glabrous, the edges minutely ciliolate. Stamens shorter than the petals and glabrous pistils. Follicle narrowly evate, curved, pointed, '75 in. long, when ripe red tipped with yellow. Onestis acuminata, Wall. Cat. 8533.

Singapore; Wallieh. Perak; King's Collector Nos. 866, 4271, 6987, 7781, 10599, 10871.

3. ROUREA COMMUTATA, Planch. in Linnaea, XXIII, 420. Shrubby, scandent; young branches puberulous becoming glabrous, sometimes minutely lenticellate. Leaves 8 to 12 in. long, glabrous; leaflets 3 to 7, thinly coriaceous, sub-opposite, elliptic-lanceolate to elliptic, sub-obtusely candate-acuminate, the base rounded, both surfaces shining; main nerves 2 to 5 pairs, curved, rather abruptly ascending; length 2.5 to 6 in., breadth 1.35 to 2.25 in.; petiolules '15 to '2 in., the terminal one larger. Flowers 35 in. in diam., in glabrous racemes or racemoid panicles much shorter than the leaves and clustered in their axils, pedicels

shorter than the flowers. Sepals broadly ovate, blunt, pubescent. Petals linear-oblong, broadly ovate. Stamens 10, alternately shorter than the filaments, expanded towards the base and united by their edges; ovaries slightly hairy on the inner side, styles glabrous. Follicles obliquely ovate-oblong, pointed, coriaceous, glabrous, 75 to 1 in. long. Seed ovate, covered by an orange-coloured arillus. Hook fil. Fl. Br. Ind. II, 47; Kurz For. Flora Burma I, 324. Cnestis monadelpha, Roxb. Fl. Ind. II, 454. Connaracea, Wall. Cat., 8547, 8548.

Andaman and Nicobar Islands.—DISTRIB. Burma, Chittagong, Sylhet and Assam.

The present species (published in 1850), R. pulchella, Blume (1850), and L. humilis, Planch. (1850), differ from each other so little that I am not sure that they should not be reduced to one, in which case the species might be named Rourea monadelpha, the earliest published name of any of them being Cnestis monadelpha, Roxb. (1832).

4. ROUREA PULCHELIA, Planch. in Linnaea XXIII, 419. Scandent, woody, quite glabrous. Leaves 3 to 7 in. long; leaflets 3 to 7, thinly coriaceous, ovate-lanceolate, obtusely caudate-acuminate, the upper surface very shining, the lower less so, both reticulate; main nerves 4 or 5 pairs, spreading, faint; length 1 5 to 3 in., breadth 75 to 1 6 in.; petiolules 15 in., slender. Racemes crowded in the axils, shorter than the leaves. Flowers 25 in. in diam., the pedicels of the same length, slender. Sepals broadly ovate, acute, ciliolate, half as long as the petals, linear-oblong. Pistils 5, ovaries pilose, styles slender. Follicle stout, curved, pointed, glabrous, 6 in. long, red when ripe. Hook. fil. Fl. Br. Ind. II. 48.

Malacca; Griffith, No. 1265. Maingay, No. 501 (Kew Distrib.); Ridley, No. 1449. Singapore, Ridley, Nos. 2028, 3981. Perak; Wray, Nos. 1167, 3774.

5. Rourea humilis, Blume Mus. Bot. Lugd. Bat. I, 262. Scandent, woody, glabrous. Leaves 3.5 to 6 in. long, the rachises slender; leaflets 3 rarely 5, coriaceous, broadly ovate or ovate-orbicular, abruptly and obtusely caudate-acuminate, the base rounded, rarely sub-cuneate, upper surface very shining, the lower less so and more distinctly reticulate; main nerves about 4 pairs, spreading, faint; length 1.5 to 3 in., breadth 1 to 2.25 in. petiolules about 2 in., the terminal leaflet the largest. Racemes axillary, clustered, slender, few-flowered; the buds sub-globose, on pedicels of about their own length. Calya-lobes sub-orbicular, glabrous. Stamens shorter than the calyx, much shorter than the styles. Follicles cylindric, pointed, coriaceous, glabrous, 75 in. long.

Nicobar Islands; Jelinek, No. 140. Kurz. Penang; Curtis, No. 2285. Pahang, Ridley, Nos. 2645, 5121; Singapore. Perak; King's Collector, No. 4677, Scortechini.—Distrib. Sumatra, Borneo.

Distinguished chiefly by its broadly ovate coriaceous leaves, very shining on the upper surface and with broad bases.

6. Rourea Rugosa, Planch. in Linnaea XXIII, 422. A stout woody climber; young branches densely cinereous-tomentose. Leaves thinly coriaceous, 12 to 15 in. long, the rachises tomentose; leaflets 8 to 15 pairs, sub-sessile, sub-opposite, narrowly oblong or oblong-lanceolate, shortly and bluntly acuminate, rarely acute, the bases rounded or minutely cordate; upper surface glabrous, smooth; the lower reticulate, sparsely pubescent, the midrib tomentose; main nerves 8 or 9 pairs, spreading, interarching very freely, prominent; length 2 to 3.25 in., breadth 6 to 1.25 in. Panicles shorter than the leaves, crowded in the leaf-axils, pubescent, many-flowered. Flowers about 2 in. long, their pedicels shorter. Sepals rotund, pubescent, half as long as the petals. Follicle about 75 in. long, pointed, glabrous, striate. Seed ovoid, apiculate, about 5 in. long. Hook. fil. Fl. Br. Ind. II, 46. Connarus-rugosus, Wall. Cat. 8527.

Singapore; Wallich. Malacca; Griffith, Maingay. Penang; Porter, Curtis. Perak; King's Collector, Wray.

7. Rourea parallela, Planch in Linnaea XXIII, 421. A power-ful woody climber often 150 feet long; young branches cinereous-pubescent. Leaves 2 to 6 in long, their rachises with crisped pubescence; leaflets coriaceous, sessile, 10 to 22 pairs, opposite or sub-opposite, oblong, the apex broad, shortly bifid; the base minutely cordate, slightly oblique; upper surface glabrous, shining; the lower with very minute pale dots, sparsely pubescent especially on the midrib; main nerves about 6 pairs, faint; length 5 to 75 in., breadth 25 to 3 in. Racemes in axillary clusters, shorter than the leaves; the rachises slender, tomentose. Flowers not crowded, 3 in in diam. and 2 in long, the pedicels slightly shorter. Sepals puberulous, half as long as the petals, broadly oblanceolate, sub-glabrous. Follicles when ripe bright red with yellow tips, glabrous, 6 to 7 in long, pointed. Seed elliptic, keeled on one side, 3 in long. Under O. similis, Bl. in Hook. fil. Fl. Br. Ind. II, 50. Connarus minusoides, Vahl. ? Wall. Cat. 8526 C.

Penang; Porter; Curtis, No. 473. Malacca; Maingay, No. 498. Perak; King's Collector, Nos. 2580, 4802, 8405, 10119, 10592, 10896; Scortechini. Singapore; Anderson, Ridley. Kedah, Curtis, No. 2629.

Blume's species R. similis (Mus. Lugd. Bat. I, 264 (September, 1850), is stated by its author to be very near to this, and indeed Sir Joseph Hooker (Fl. Br. Ind. II, 50) has taken Blume's name in preference to Planchon's. R. sororia, Planch. from Bornee must, from the description, be also very near this.

VAR. major. Flowers 3 in. long and 35 in. in diam. in lax panicles; leaflets nearly 1 in. long.

Perak; King's Collector, No. 5516.

8. ROUREA FULGENS, Planch. in Linnaea, XXIII, 423. A woody climber; young branches minutely and deciduously rusty-tomentose. Leaves 3 to 5 in. long, the rachis tomentose; leaflets 12 to 24 pairs, thinly coriaceous, oblong, slightly oblique, entire, obtuse, the base rounded or sub-cordate, usually oblique; upper surface glabrous, reticulate, minutely rugulose when dry, the lower rather densely covered with rusty silky pubescence; length 4 to 65 in., breadth 15 to 25 in. Racemes axillary, solitary, shorter than the leaves, pubescent, pedicels short. Flowers unknown. Follicles 75 in. long, much curved. Hook. fil. Fl. Br. Ind. II, 46. Connarus fulgens, Wall. Cat. 8524.

Singapore; Wallich; Ridley, Nos. 2027, 4568. Malacca; Maingay, No. 499.

9. Rourea concolor, Blume Mus. Bot. Lugd. Bat. I, 264. A woody climber; young branches rusty-pubescent. Leaves 1 to 4 in. long, the rachises tomentose; leaflets 4 to 16 pairs, thinly coriaceous, sub-sessile, broadly oblong, with very obtuse or truncate apex and broad oblique minutely cordate base; both surfaces glabrous, the upper shining, the lower minutely dotted and boldly reticulate; main nerves about 3 pairs, spreading; length 3.5 to 5 in., breadth 1.5 to 3 in. Racemes about as long as the leaves, axillary, slender, rusty-tomentose; pedicels slender, 25 in. long, as long as the flowers. Sepals orbicular, only half as long as the oblong petals, stamens as long as the petals. Follicles 5 to 75 in. long, pointed. Hook. fil. Fl. Br. Ind. II, 49. R. parvifolia, Planch. in Linnaea, Vol. XXIII, 420. Connarus minusoides, Wall. (not Vahl.) Cat. 8526 B. Cnestis minusoides, Jack in Mal. Misc. Vol. II, VII, 44.

Singapore; Prince, Ridley, No. 2026, Hullett. Malacca; Griffith, No. 1262 (Kew Distrib.) Perak; King's Collector, No. 4373.—DISTRIB.

# 4 ROUREOPSIS, Planch.

Sarmentose or scandent shrubs. Leaves unequally-pinnate, leaflets few. Flowers in axillary racemes; pedicels slender, bracteolate at the base. Sepals oblong, slightly imbricate, somewhat enlarged and spreading, but not clasping the base of the capsule. Petals linear-oblong. Stamens 10, the alternate longer. Ovaries 5, styles slender. Capsule linear-oblong, straight. Seed ovoid; testa thin, black, arilliform at the base; cotyledons amygdaloid.—Distrib. Species 3, all Malayan.

This genus differs from Rourea in having straight (not curved) follicles, at the base of which the persistent sepals are free, and also in having bracteoles at the base

Leaflets puberulous beneath

, quite glabrous ... ... ... ... ... ... ... 1. R. pubinervis.

... 2. R. Scortechinii.

1. ROUREOPSIS PUBINERVIS, Planch. in Linnaea, XXIII, 424. A woody climber, sometimes as long as 50 feet; young branches with pale striate puberulous bark. Leaves 2.5 to 5 in. long, the rachises pubescent; leaflets membranous, 5 to 9, (the terminal one larger than the others), narrowly ovate-elliptic, tapering to each end, the apex abrupt and notched, the base cuneate; upper surface glabrous; the lower paler, puberulous on the midrib and sometimes on the nerves; main nerves 4 or 5, inter-arching, not much more prominent than the intermediate nerves; length of lateral leaflets '7 to 1.7 in., breadth '5 to ·75 in. Racemes slender, shorter than the leaves, solitary or in fascicles of 2 or 3 in the leaf axils, laxly few-flowered. Flowers 35 in. long; their pedicels of about the same length, each with a minute pubescent persistent bracteole at its base. Sepals broadly oblong, obtuse, pilose near the apex, about half as long as the linear-oblong sub-acute glabrous petals. Stamens shorter than the sepals and pistils; ovaries pubescent. Follicles ovate, 5 or 6 in, long, not curved; the persistent calvx-lobes free, erect, about one-third as long as the fruit. Hook, fil. Fl. Br. Ind., II. 50. Indeterminata, Wall. Cat. 9050.

Penang; Porter; Curtis, 2332 and 2749. Malacca; Griffith, Maingay No. 500. Perak; very common, Scortechini, King's Collector.— DISTRIB. Java.

2. ROUREOPSIS SCORTECHINII, King n. sp. A slender sarmentose woody shrub, all parts except the inflorescence glabrous, young branches minutely lenticellate Leaves 6 to 10 in. long, the rachis rather slender; leaflets 7 to 9, sub-opposite, very thinly coriaceous, ovate-lanceolate, tapering from below the middle to the long rather blunt acuminate point, the base cuneate; upper surface shining, the lower rather dull, paler and conspicuously reticulate; main nerves about 4 pairs, faint, the lower very oblique; length 2.25 to 3 in., breadth 1 to 1.25 in., petiolules about 'l in., stout; the lowest leaflets the smallest. Racemes slender, axillary, 1 to 2 in. long, laxly-flowered, minutely and sparsely rusty-pubescent. Flowers about 25 in. long, on slender pedicels about ·2 in. long, each pedicel with a minute rusty-tomentose bracteole at its base. Calyx-lobes ovate, obtuse, ciliolate, hairy inside, glabrous outside. Petals longer than the calyx, lanceolate, plicate in bud, yellowish. Filaments slightly coherent at the base, glabrous. Pistils 5, only 1 or 2 fertile. Fruit narrowly ovoid, not curved, pointed, coriaceous, glabrous, 1 in. long.

Perak; Scortechini, No. 613. Curtis (elevation 5,000 feet), No. 1998.

Scortechini's specimens have flowers in bud only, and none of them is in fruit. The foregoing description, as respects the flower, is copied from his field note. The fruit is described from what I take to be the same plant collected by Curtis in Perak at an elevation of 5,000 feet and described by him as a small tree.

#### 5. AGELÆA, Soland.

Erect or scandent shrubs. Leaves 3-rarely 5-foliolate. Panicles or racemes axillary. Calyx 5-partite, not accrescent nor embracing the fruit, imbricate or subvalvate. Petals lanceolate or ligulate, obtuse, free or connate at the middle. Stamens 5 or 10. Disc \(\frac{1}{2}\)-annular or 0. Pistils 2-5. Follicles 1-3, sessile or shortly stalked, coriaceous, rugose or lamellate. Seed erect, exalbuminous; testa arilliform below the middle.—Distrib. 12 species, African and Asiatic.

Main nerves of leaflets 2 or 3 pairs, sub-erect, curving.

All parts more or less pubescent, stamens 5 ... 1. A. vestita.

All parts, except the inflorescence, glabrous; stamens 10 ... 2. A. Wallichii.

Main nerves of leaflets 7 to 10 pairs, spreading.

Leaflets 3 to 5, all parts more or less pubescent; stamens 5.. 3. A. pinnata. Leaflets never more than 3, adult leaves quite glabrous;

stamens 10 ... ... ... 4. A. Hullettii.

1. AGELEA VESTITA, Hook. fil. Fl. Br. Ind. II, 46. A rather slender woody creeper 20 to 80 feet long; young branches at first rusty-tomentose but soon becoming sub-glabrous or glabrous. Leaflets membranous, unequal, more or less ovate or elliptic, with rounded base and caudateacuminate apex; the terminal one the larger, sometimes ovate-rotund to sub-rhomboidal; its petiolule 5 or more in length, swollen at the apex; the lateral leaflets inequilateral, the petiolule only '1 or '2 in. long; upper surface of all sparsely adpressed-pubescent, the midrib and nerves tomentose; lower surface pubescent; main nerves about 3 pairs (one pair sub-marginal), much curved, prominent as are the intermediate nerves and reticulations; length of the lateral leaflets 2:5 to 3 in., breadth 1.25 to 1.75 in., the terminal one larger. Panicles extra-arillary, less than 1 in. long, tomentose, with many short branches. Flowers under 2 in. long, on slender pedicels. Calyx cleft to the very base; the segments unequal, linear, tomentose, shorter than the glabrous yellowish oblanceolate or linear petals. Stamens 5, unequal. Styles 2 to 5, slender, with a few white hairs. Follicles solitary, bright red, rarely in pairs, ovoid, boldly tuberculate or lamellate externally and tomentose, about ·6 to ·8 in. long, usually with a short curved stout apical beak. Seed narrowly sub-obovoid, black, 4 in. long, pale and arilliform near the base. Cnestis vestita, Wall. in Herb. Linn. Soc. Connaracea, Wall. Cat. 8535. Hemiandrina borneensis, Hook. f. in. Trans. Linn. Soc. xxxiii. 171, t. 28. Troostwyckia singularis, Miq. Fl. Ind. Bat. Suppl. 531.

Singapore; Jack, Ridley. Penang; Porter, Curtis. Malacca; Griffith, Maingay. Perak; King's Collector, Scortechini, Johore, Ridley.—DISTRIB. Sumatra, Borneo.

A very common species in Perak. The arillus of the seed is very inconspicuous

in dried specimens. The number of the pistils varies from 2 to 5. There are in the Kew Herbarium fruiting specimens of a plant collected by Griffith which exactly resembles this except that its fruits (which are immature) are non-tuberculate and are covered with a dense coating of long silky tawny hairs. The same plant was collected by the Calcutta Garden Collector (No. 6878), but also without flowers. I believe the dense hairiness of the fruit of both gatherings to be due to the irritation caused by the deposit of the eggs of some insect in the young fruit.

AGELÆA WALLICHII, Hook. fil. Fl. Br. Ind II, 47. A slender woody creeper 20 to 50 feet long, all parts except the inflorescence glabrous. Leaflets coriaceous, slightly unequal, ovate-elliptic, with rounded or cuneate bases and short caudate-acuminate apices; the petiolule of the terminal leaflet about 1 in. long, thickened near the apex; the petiolules of the lateral leaflets about 25 in. long; both surfaces shining, the lower reticulate; length 3 to 4.5 in.; breadth 1.5 to 2.25 in.; main nerves 2 or 3 pairs, ascending, much curved, one pair submarginal. Panicles under 1 in. long, extra-axillary, pubescent. Flowers ·25 in in diam., on pedicels longer than themselves. Calyx divided for three-fourths of its length into 5 ovate-lanceolate imbricate segments, sparsely pubescent externally, glabrous internally, their edges densely sericeous. Petals longer and narrower than the segments of the calvx, glabrous, linear, sub-acute. Stamens 10, sub-equal, longer than the styles, much shorter than the petals. Pistils 5, very short, stout. Follicle usually solitary, bright red when ripe, ovoid, curved, shortly beaked, covered outside with short obtuse tubercles and minutely rustytomentose, inside glabrous, 6 in. long. Seed oblong, black, its lower half pale and arilliform. Connaracea, Wall. Cat., 8544.

Singapore; Wallich. Malacca; Griffith (Kew Distrib.) No. 1275, Maingay, No. 511, Derry, No. 69. Penang; Curtis, Nos. 1633 and 3032. Perak; Wray, No. 48, Scortechini, No. 1730, King's Collector, No. 3735.

-DISTRIB. Sumatra, Forbes, No. 2589.

3. AGELMA PINNATA, King n. spec. A woody climber 30 to 40 feet long; young branches rusty-puberulous, striate. Leaflets 3 to 5, thinly coriaceous, unequal, (the middle the largest), elliptic, broadly and shortly caudate-acuminate, the base rounded or sub-cuneate; upper surface glabrous except the minutely pubescent midrib; lower surface minutely sub-adpressed pubescent, the transverse veins distinct; the midrib tomentose; main nerves 7 to 10 pairs, spreading and curving upwards, prominent on the lower surface, slightly impressed on the upper; length of the terminal leaflet 6 to 8 in., breadth 3 to 3.5 in.; its petiolule jointed to the rachis and not longer than those of the lateral slightly smaller leaflets. Panicles about 1 in. long, densely crowded in the axils of the leaves, many-flowered, minutely tomentose. Flowers 3 in long, their pedicels half as long. Calyx divided to the very base into 5 linear acuminate reflexed segments, half as long as the petals, tomentose externally. *Petals* linear, much acuminate, glabrous, white inside and purple outside. *Stamens* 5, shorter than the pistils, the anthers sub-globular. *Pistils* 5, the ovaries softly tomentose; the styles spreading, recurved; the stigma bifid. *Fruit* unknown.

Perak; King's Collector, No. 5425.

This differs notably from both the other species of this genus in its leaflets having often 5 instead of 3 leaflets. In the structure of its flowers, however, it agrees perfectly with the diagnosis of the genus. It is more nearly allied to A. vestita than to A. Wallichii, but it differs from both in the larger number of main nerves in its leaves. Its flowers are moreover larger than these of A. vestita, and the petals are differently coloured.

4. AGELEA HULLETHI, King n. spec. A woody creeper 15 to 20 feet long; young branches minutely tomentose. Leaflets 3, coriaceous; the terminal slightly the largest, narrowly elliptic-oblong; the lateral pair slightly oblique, all with acute apices and cuneate bases; the petiolule of the terminal one from .5 to .75 in. long, jointed; those of the lateral pair 25 in. long; upper surface glabrous and minutely pitted, the lower finely reticulate, when young sub-lepidote and puberulous. when adult glabrous; main nerves 7 or 8 pairs, spreading and curving upwards, prominent on the lower and obsolete on the upper surface; some of the intermediate nearly as distinct; length of the terminal leaflet 6 to 9 in., breadth 2 to 2.5 in., the lateral pair rather smaller. Panicles less than I in. long, minutely tomentose, crowded in the leaf-axils or from the axils of fallen leaves, many-flowered. Flowers ·2 in. long and about the same across; their pedicels about ·25 in. long. Calyx divided for two-thirds of its length into 5 lanceolate segments, tomentose outside, glabrescent inside. Petals longer than the sepals. spreading, linear-oblong, glabrous, with a mesial rib, recurved from about the middle. Stamens 10, the alternate ones shorter, none of them so long as the pistils. Ovaries narrowly oblong, tomentose. Styles sub-glabrous, slightly diverging. Follicles 1 to 3, bright red when ripe, woody, ovoid, shortly beaked, externally tubercled and minutely rustytomentose, inside glabrous, length 5 to 65 in. Seed sub-cylindric, compressed, the upper half black, the lower pale and arilliform, '5 in. long.

Singapore; Hullett, No. 841; Ridley, No. 4589. Perak; King's Collector, No. 5729.

This is distinguished from A. pinnata by the leaflets being invariably 3 and the stamens being only 5 while, in that species, there are often 5 leaflets and always 10 stamens. This resembles A. Wallichii in some respects, but it differs from that species in having larger leaflets more cuneate at the base with acute, not caudate-acuminate, apices and with more than twice as many main nerves. The leaflets of the former are moreover quite glabrous at all stages, while in this the lower surface of the young leaflets is puberulous and lepidote.

Connarus Diepenhorstii, Miq. Fl. Ind. Bat. Suppl. 529, (of which a type specimen is in the Calcutta Herbarium) is unmistakeably a species of Agelæa and should be named Agelwa Diepenhorstii. It is allied to A. Wallichii, Hook. fil., but has larger leaflets and much longer racemes. To this belong Teysmann's Sumatra specimens from Prianam (Herb. Hort. Bogor., No. 2197), and Forbes's from the Lampongs in Sumatra, Nos. 1313 and 1386.

#### 6. TENIOCHLENA, Hook, f.

A rambling shrub. Leaves unequally pinnate, glabrous; leaflets 3, quite entire. Panicles axillary, short. Flowers hermaphrodite. Calyxtube short, hemispheric; segments 5, enlarged and revolute in fruit. valvate. Petals 5, much exceeding the calyx. Stamens 10, alternately shorter, nearly free at the base. Ovaries 5, sessile; styles short, stigmas discoid. Follicles 1-3, ovoid, pubescent; valves glabrous within. Seed

oblong, arillate; albumen 0, cotyledons plano-convex.

TENIOCHLENA GRIFFITHII, Hook. fil, in Benth. and Hook. Gen. Pl. I, 434; Fl. Br. Ind. II, 55. Young branches puberulous, and with pale brown lenticels; all parts except the inflorescence quite glabrous. Leaflets coriaceous, the terminal largest, elliptic to ovate-elliptic, with sub-acute slightly bifid apices, slightly narrowed to the rounded base, the edges slightly sub-revolute when dry; both surfaces shining, the lower reticulate; main nerves 4 or 5 pairs, the lower pair sub-marginal, all curved upwards, prominent on the lower and depressed on the upper surface; the petiolules of all jointed, 15 in. long; length of the terminal leaflets 5 to 6.5 in., the laterals smaller. Panicles (fide Sir J. D. Hooker) "2 to 3 in. long, fascicled, densely pubescent, slender. Flowers rotate, :33 in in diam. Segments of the cally obling, pubescent, recurved in flower. Petals twice as long, linear, dilated upwards, glabrous; filaments short, subulate. Follicles 2 or 3, 5 to 1 in. long, obtuse, densely pubescent, valves coriaceous. Seed short, slightly compressed, testa black, arillus small."

Malacca; Griffith, Maingay, No. 497.

# 7. CNESTIS, Juss.

Scandent shrubs or trees. Leaves unequally pinnate; leaflets many, quite entire. Flowers in racemes, tomentose, rarely panicled, polygamous or directors, rotate. Sepals 5, valvate or imbricate at the tip, spreading in fruit. Petals 5, shorter or longer than the calyx. Stamens 10, free. Ovaries 5-7, sessile; styles short, stigmas capitellate. Capsules 1-3. kidney-shaped, cylindric, curved or waved, pubescent, often villous or clothed with rigid hairs within. Seed with a thin arillus, albumen fleshy, cotyledons thin.—DISTRIB. Tropical Asia and Africa; species about 17.

CNESTIS RAMIFLORA, Griff. Notul. IV, 432. A small tree or a climber, young branches, rachises of leaves, under surfaces of leaflets and inflorescence more or less softly rusty-tomentose. Leaves 8 to 15 in. long; leaflets 19 to 31, sub-sessile, narrowly oblong, rarely slightly obovate, obtuse or sub-acute; the base broad, rounded or minutely, cordate: upper surface sparsely adpressed-pubescent or glabrescent, the nerves pubescent; main nerves 4 or 5 pairs, spreading, faint; length 1.25 to 3 in., breadth 4 to 1.5 in. Racemes much shorter than the leaves, in axillary fascicles. Female flowers about 35 in. in diam., the males smaller. Sepals narrowly oblong, obtuse, pubescent on both surfaces. Petals similar in shape to the sepals but sometimes longer. glabrous. Stamens much shorter than the sepals, the filaments glabrous. Disc and Ovaries 5, tomentose, styles short. Follicles 1 to 3 from one flower, sessile, compressed, falcate, widest about the middle, much curved, rugose, rusty-pubescent; the pericarp very thick, woody, lined inside with a dense layer of sericeous tomentum, 1.5 to 1.75 in. long and 8 in. broad. Seed broad, compressed, the testa and arillus thin. Kurz Journ. As. Soc. Beng. Vol. XLV, pt. 2, p. 216; For. Flora Burma, I, 329; Hook. fil. Fl. Br. Ind. II, 54. C. flaminea, Griff. Notul. VI, 433. C. platantha, Griff. l. c. 434; Kurz l. c. Unestis foliosus and C. igneus, Planch. MSS. in Herb. Kew. Connarus foliosus, Jack in Wall. Cat. 8529. C. igneus, Wall. Cat. 8528. Rourea dasyphylla, Miq. Fl. Ind. Bat. Suppl. 528.

In all the provinces, a common plant.—DISTRIB. Burma, Sumatra, Philippine Islands.

A widely distributed plant and therefore presenting various forms, some of which (as the synonymy shows) have been regarded as species. The form which is most distinct is that which assumes the habit of a small tree; but its flowers and leaves are in no way different from those of the scandent forms. This was, however, kept separate by Kurz under the specific name *C. ramiflora* Griff.; while, for the scandent forms, he kept the name *C. platantha*, Griff.

# ORDER XXXVIII. LEGUMINOSÆ. (By D. Prain.)

Herbs, shrubs or trees. Leaves stipulate and usually alternate, pinnate or digitate or simple, often stipellate, sometimes with the rachis ending in a bristle or tendril. Inflorescence axillary or leaf-opposed or terminal; usually simply racemose or panicled; bracts and bracteoles usually both present. Flowers usually irregular, hermaphrodite, rarely regular or polygamous. Sepals 5, combined or free, often unequal, sometimes arranged in two lips. Petals 5, rarely fewer by arrest, very

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rarely 0, usually free and unequal. Stamens normally 10, perigynous or almost hypogynous, rarely fewer by arrest, or indefinite; filaments free or variously combined; anthers 2-celled, dehiscence almost always longitudinal. Ovary free, style simple, cylindric, usually declinate; stigma capitate, terminal or oblique; ovules  $1-\infty$  on the ventral suture. Fruit usually dry, a pod splitting open along both sutures, sometimes opening only along the ventral suture, sometimes continuous and indehiscent, sometimes separating into one-seeded indehiscent segments. Seeds usually exalbuminous; cotyledons foliaceous or amygdaloid, with a straight or an inflexed accumbent radicle.

A very large order with three very natural suborders, including altogether about 8,000 species. Of these suborders the *Papilionace* are cosmopolitan in distribution, the *Cæsalpinie* and the *Mimose* are confined to the tropics and to warm temperate regions.

Petals imbricate :-

Calyx segments united above the level of the disc; the upper petal (standard) exterior (Papilionaceæ):—

Stamens mon- or diadelphous :-

Pods dehiscent along both sutures :-

Leaves even-pinnate the rachis continued as a tendril or bristle ... ...

Leaves simple, digitate or odd-pinnate:-

Leaves simple sessile, or digitately 3-7-foliolate; stamens monadelphous, anthers dimorphous ... ... ... ...

Leaves pinnately 3-foliolate, rarely (Clitoria) 5-7-foliolate or (Flemingia) petioled 1-foliolate or digitately 3-foliolate and then with 2-adelphous stamens; when stamens 1-adelphous, the upper filament attached to the others at its base ... ...

Leaves  $5-\infty$ -foliolate, or if 1-3-foliolate (*Tephrosia*) with partially monadelphous stamens and uniform anthers, or (*Indigofera*) with 2-adelphous stamens, apiculate anthers and basifixed hairs; when stamens monadelphous the upper stamen free at its base ...

Pods indehiscent or opening along lower suture; (leaves, except Arachis and Smithia, odd-pinnate):—

Pods not segmented, always quite indehiscent; leaves all odd-pinnate ...

Pods breaking into 1-seeded indehiscent segments, or if dehiscent (*Desmodium* in part) only opening along lower suture; if not segmented (*Arachis*) with leaves even-pinnate; (segment solitary in *Phylacium*) ...

Stamens free ...

I. VICIEÆ.

II. GENISTEE.

III. PHASEOLEE.

IV. GALEGEÆ.

V. DALBERGIEÆ.

VI. HEDYSARRÆ. VII. SOPHOREÆ.

22

Calvx segments free to the level of the disc (except Bauhinieæ); the upper petal interior (Cæsalpinieæ):-Leaves simple or simply pinnate :-... VIII. CASSIEÆ. Anthers basifixed Anthers versatile:-Petals 5:-Calyx gamosepalous or valvately partite IX. BAUHINIEÆ. Calyx lobes free imbricate X. CYNOMETREÆ. Petals fewer than 5 (3 or 1 or 0) ... XI. AMHERSTIEÆ. ... XII. CÆSALPINIEÆ. Leaves 2-pinnate Petals valvate (MIMOSEÆ):-... XIII. PARKIEÆ. Calyx teeth imbricated Calyx valvate :-Stamens 5 or 10:-Anthers glandular ADENANTHERE A. Anthers not glandular XV. EUMIMOSEÆ. Stamens co :--Filaments free XVI. ACACIEÆ. Filaments united ... XVII. INGEÆ.

A. SUBORDER I. PAPILIONACEE. Calyx segments united beyond the disc. Petals imbricated, the upper external. Radicle inflexed accumbent or, rarely, very short and straight.

TRIBE I. VICIEE. Dwarf herbs or climbers. Leaves usually evenpinnate, the petiole produced in a spine or tendril, leaflets entire exstipellate; stipules often foliaceous. Flowers solitary or racemose. Stamens diadelphous (9+1). Pod dehiscent.

#### 1. Abrus.

Tribe II. Genistee. Shrubs, sometimes tree-like, or non-climbing herbs. Leaves simple or digitately  $3-\infty$ -foliolate, rarely 1-foliolate; stipules small, free. Flowers in racemes or spikes. Stamens monadelphous: anthers almost always 2-morphous. Pod dehiscent.

#### 2. Crotalaria.

TRIBE III. PHASEOLEE. Climbing or creeping herbs, rarely erect and shrubby, very rarely trees. Leaves pinnately 3-foliolate, rarely 1-or 5-7-foliolate, leaflets entire or lobed, almost always stipellate. Bracts 2 opposite persistent stipular or caducous. Stamens monadelphous, but if so the upper filament always free at the base; or diadelphous (9+1) by more or less complete detachment of the upper; anthers uniform very rarely (Mucuna) 2-morphous. Pod dehiscent.

Leaves gland-dotted beneath ... ... ... ... ... A. Cajaneæ.

Leaves not gland-dotted beneath:—

Style bearded and bracts very small or deciduous ... B. Euphaseoleæ.

Style beardless, or if bearded (Clitoria) with bracts persistent:—

Rachis of inflorescence not swollen at nodes (style bearded in Clitoria) ... C. Glucineæ.

Rachis of inflorescence nodose :-

Upper stamen subconnate with the others and petals subequal ... ... ... ... ... ... D. Dioclez.
Upper stamen free or if subconnate, then petals very

unequal:-

Petals very unequal ... ... E. Erythrinez.
Petals of same length ... ... F. Galactiez.

Sub-tribe A. Cajaneze. Inflorescence racemose, rachis not swollen, or flowers subumbellate or solitary, bracts usually membranous caducous, bracteoles 0; petals of subequal length; upper stamen free; style bearded, stigma terminal; leaves gland-dotted at least beneath; stipels small, sometimes 0.

3. Flemingia. Ovules 2; pod turgid, leaves subdigitate or 1-foliolate.

4. Eriosema. Ovules 2; pod compressed, leaves pinnately 3-foliolate; funicle terminal on hilum.

- 5. Dunbaria. Ovules  $4-\infty$ ; pod compressed, not deep-lineate between the seeds.
- 6. Atylosia. Ovules 4-co; pod compressed, deep-lineate between the strophiolate seeds.

7. Cajanus. Ovules 4-\infty; pod compressed, deep-lineate between the seeds; strophiole 0.

Sub-tribe B. Euphaseoleæ. Inflorescence racemose, rachis nodose, bracts small or caducous; petals equal in length or the keel long-beaked, or spirally twisted; upper stamen free; style longitudinally bearded along the inner face or less often simply pilose round the stigma.

8. Phaseolus. Keel spiral.

9. Vigna. Keel not spiral; stigma oblique, style not flattened upwards; pods not lineate between seeds.

10. Pachyrhizus. Keel not spiral; stigma oblique globose on inner face of style flattened upwards; pod lineate.

11. Dolichos. Keel not spiral; stigma terminal; pod not winged.

 Psophocarpus. Keel not spiral; stigma terminal; pod square, winged at the 4 corners.

Sub-tribe O. Glycinese. Inflorescence of axillary fascicles or racemes of solitary or geminate flowers on an unswollen rachis; standard not appendiculate or (in small flowered genera) minutely appendiculate at the base; upper stamen free or united at the base with the rest; style naked (bearded in Clitoria).

13. Clitoria. Bracts persistent; standard large not spurred; calyx-tube long; style bearded; stamens 10 fertile.

14. Centrosema. Bracts persistent; standard large spurred on the back; calyx-tube short; style naked; stamens 10 fertile.

15. Teramnus. Bracts small decidous; standard small; stamens alternate, 5 fertile, 5 sterile.

Sub-tribe D. Diocleæ. Inflorescence racemose with rachis swollen at the nodes, bracts small or caducous; calyx usually 4-lobed from union of the two upper teeth, rarely very unequally 2-lipped; petals subequal in length; upper stamen free at the base, connate with the remainder above; style not bearded.

- 16. Dioclea. Calyx campanulate; pod broad much thickened along upper suture.
- 17. Pueraria. Calyx campanulate; pod linear, flat or narrow.
- 18. Canavalia. Calyx 2-lipped; with a large upper and small lower lip.

Sub-tribe E. Erythrineæ. Inflorescence usually racemose with rachis nodose, flowers showy with unequal petals—in some genera with very large standard longer than the wings and sometimes than the keel also, in others with standard much exceeded by the large cochleate keel; upper stamen free or united at the base with the remainder; style naked; bracts usually small, deciduous.

- 19. Mucuna. Keel longest, standard shorter than wings; anthers 2-morphous; climbers.
- 20. Strongylodon. Standard and keel equal and longer than wings; anthers uniform; climbers.
- 21. Erythrina. Standard longer than keel and wings; anthers uniform; armed trees. Pod sometimes dehiscent only at apex, sterile and indehiscent below.

Sub-tribe F. Galacties. Inflorescence racemose with nodose rachis, more rarely amply paniculate; bracts small very deciduous; calyx usually 4-lobed, the two upper teeth connate; petals sub-equal in length; upper stamen free; style not bearded.

22. Spatholobus. Pod 1-seeded at the apex only and there partially dehiscent, sterile and indehiscent below.

Tribe IV. Galege. Herbs never twining, erect shrubs, or less often trees or large woody climbers. Leaves odd-, very rarely even-pinnate without the rachis prolonged, leaflets  $\infty$ , or rarely 3-1, usually entire. Stamens 10, the lower 9 united as far as their middle or further in a sheath split along the upper side or less often closed in the middle, the upper sometimes free from the base, at others connate by its middle with the sheath, very rarely wanting; filaments filiform at the tips, anthers versatile uniform, or rarely somewhat dimorphous. Pod not segmented, 2-valved or if indehiscent usually small, 1-2-seeded or membranous inflated. Seeds rarely strophiolate.

Anthers with connective apiculate or gland-tipped ... Anthers muticous:—

... A. Indigoferex.

Racemes all axillary or from old nodes

... B. Robinieæ.

Racemes terminal, or leaf-opposed, or paniculate ends of branches

Sub-tribe A. Indigoferez. Herbs or shrubs, gractiez. Erythrineæ. not, usually hoary canescent, the bairs always fixen, or racemes or spikes axillary; connective of anther produs, or mucro; ovules usually ∞; pod 2-valved. 23. Indigofera.

Sub-tribe B. Robiniez. Herbs, erect or rarely climbing style trees; racemes all axillary or fasciculate on old nodes; upper stamen usually free; anthers muticous; ovules ∞; style usually rigid; pod usually 2-valved, flat or only turgid opposite the seeds.

Sub-tribe C. Tephrosiez. Herbs, erect or large climbing shrubs, or trees; racemes terminal or leaf-opposed or panicled at the ends of branches, rarely arising from upper axils, or with the lower or all the pedicels geminate or fasciculate in the axils of leaves; authers muticous; ovules usually  $\infty$ ; style usually rigid; pod 2-valved.

Tephrosia. Leaves striate-veined; pod thin, early dehiscent.

26. Millettia. Leaves reticulate-veined; pod firm, tardily dehiscent.

TRIBE V. DALBERGIEE. Trees or erect or lofty climbing shrubs. Leaves pinnately 5-∞-foliolate, very rarely 3- or 1-foliolate, usually Inflorescence various, paniculate, fascicled racemose, or cymose. Stamens all united in one sheath, entire or split along the upper side, or in two lateral half-sheaths from simultaneous fission along both upper and lower sides, or the upper stamen free the rest connate; anthers usually uniform. Pod longer than the calyx, membranous, coriaceous, woody or drupaceous, indehiscent and not segmented.

Leaflets alternate A. Lonchocarpeæ.

Sub-tribe A. Lonchocarpeæ. Leaflets opposite; pod not drupaceous; seeds usually transverse or attached by a lateral hilum, not pen-

- 27. Pongamia. Pod coriaceous, not winged; calyx subtruncate.
- Derris. Pod coriaceous or membranous, winged; calya subtrun-
- Kunstleria. Pod membranous not winged; calyx toothed.

Sub-tribe B. Pterocarpeæ. Leaflets alternate; pod not drupaceous; seeds usually transverse or attached by a lateral hilum, not pen-

- Dalbergia. Anthers small, terminal; pod oblong or linear. Pterocarpus. Anthers versatile; pod suborbicular. 31. 26

TRIBE VI. Hedysares. Herbs, undershrubs or shrubs sometimes twining or climbing, rarely trees. Leaves odd- or rarely even-pinnate, petiole if produced not cirrhate, leaflets 3-\infty, rarely digitately 3-4-foliolate, 1-foliolate or simple. Stamens diadelphous, 9 connate in a sheath as high as their middle or higher and split along the upper side, the upper being free, or monadelphous in a sheath split along the upper side, or diadelphous in two equal lateral half-sheaths (split simultaneously along upper and lower sides) or rarely all free; filaments free at their tips, filiform or dilated upwards; anthers uniform versatile, or rarely 2-morphous, the alternate larger subbasifixed. Pod indehiscent separating into 1-seeded segments, rarely unsegmented (Arachis), or by abortion or organically (Phylacium) 1-seeded. Seeds rarely strophiolate.

Stamens monadelphous, anthers 2-morphous; leaflets evenpinnate or digitate, exstipellate ... ... A. Stylosanthez. Stamens diadelphous, anthers uniform; leaflets odd-pinnate or simple.

Leaflets exstipellate, staminal phalanges 5+5 ... B. Aeschynomeneæ.

Leaflets stipellate, staminal phalanges 9+1 ... C. Desmodieæ.

Sub-tribe A. Stylosantheæ. Herbaceous approaching undershrubs, often viscid; leaves exstipellate, leaflets few; flowers spicate, capitate or rarely subracemose, in terminal spikes, or axillary by suppression of floral branches; bracts 1-foliolate and 2-stipulate, or stipuloid from suppression of the leaf-element; stamens monadelphous; anthers 5 oblong basifixed, 5 alternate shorter versatile.

32. Arachis. Calyx-tube long filiform; leaves even-pinnate; pod not segmented ripening underground.

33. Zornia. Calyx-tube not elongated; leaves digitately 2-4-foliolate.

Sub-tribe B. Aeschynomeneæ. Herbs, undershrubs or shrubs; leaves pinnate, leaflets  $\infty$ , or rarely 1-3, exstipellate; flowers usually in few-fld. axillary racemes, rarely in axillary fascicles or subcymose; keel obtuse or beaked, incurved; wings usually transversely folded; stamens (in Malayan genera) connate in two lateral phalanges; style filiform.

- 34. Smithia. Pod folded within calyx.
- 35. Ormocarpum. Pod straight exserted, joints oblong; ovary sessile.
- 36. Aeschynomene. Pod straight exserted, joints quadrate or suborbicular; ovary stipitate.

Sub-tribe C. Desmodieæ. Herbs, rarely twining, or undershrubs, less often shrubs, very rarely trees; leaves pinnately 3-foliolate or 1-foliolate the distal leaflets 2-stipellate the lateral leaflets opposite, each 1-stipellate, rarely 5-7-foliolate; stipules often striate; flowers in pairs

along the rachis of a raceme, rarely fasciculate or solitary, the racemes terminal or casually at the same time also axillary; standard usually cuneate at the base, wings as long as or longer than keel and usually adherent to its base; upper stamen free or coherent with the rest from the base upwards; pod sometimes (*Phylacium*) 1-jointed, sometimes (*Desmodium* § *Nicholsonia*) opening along the lower suture.

37. Phylacium. Ovary 1-ovuled; pod 1-seeded.

38. Uraria. Ovary 2- or more-ovuled; pod folded inside calyx; calyx-tube short, teeth long, not accrescent.

Lourea. Ovary 2- or more-ovuled; pod folded inside calyx;
 calyx-tube large, teeth small, accrescent in fruit.

40. Alysicarpus. Ovary 2- or more-ovuled; pod straight exserted; joints of pod coriaceous as thick as they are long and broad.

41. Desmodium. Ovary 2- or more-ovuled; pod straight exserted; joints of pod membranous or, if coriaceous (§ Dendrolobium), broader than their thickness, and, if as thick as they are broad, (§ Scorpiurus) then much longer than broad.

TRIBE VII. SOPHOREE. Trees or tall shrubs, very rarely subherbaceous or large climbers. Leaves pinnately  $5-\infty$ -foliolate or 1-foliolate. Corolla papilionaceous or almost regular the upper petal outer in bud, the lower ones occasionally absent. Stamens 10, free or very slightly connate at the base. Pod indehiscent unsegmented, or 2-valved. Radicle straight, incurved or inflexed.

42. Sophora. Pod moniliform elongated, indehiscent.

43. Ormosia. Pod short thickly coriaceous, 2-valved.

B. SUBORDER II. CESALPINIER. Calyx-segments partite to the disc, very rarely (some Bauhinias) gamesepatous. Petals imbricated the uppermost internal. Radicle straight or, rarely, slightly oblique. Stamens almost always free.

TRIBE VIII. CASSIEE. Trees, rarely shrubs or undershrubs. Leaves odd- or even-pinnate. Calyx segments or sepals 5, rarely 4-3, divided to the disc, imbricate or rarely subvalvate. Petals 5 or fewer or 0. Anthers erect, thick, basifixed, dehiscence longitudinal or 2-porose; or rarely dorsifixed and 2-porose. Ovary or stipe free inside calyx-tube. Ovules 2—∞, rarely 1. Seeds albuminous.

44. Cassia. Sepals 5, petals 5; stamens 10 or 5, leaves even-pinnate.

45. Koompassia. Sepals 5, petals 5; stamens 5; leaves odd-pinnate.
46. Dialium. Sepals 5, petals 2 or 1 or 0, stamens 2; leaves odd-pinnate.

TRIBE IX. BAUHINIEE. Woody tendril-bearing climbers, rarely trees. Leaves simple, entire or 2-lobed; rarely 2-foliolate. Calyx gamo-

sepalous above the disc or valvately partite, the tip 5-toothed or less often 5-lobed with teeth or lobes imbricated. *Petals* 5. *Anthers* versatile. *Ovary* with stalk free or adnate to calyx-tube. *Ovules* 2- $\infty$ . *Seeds* albuminous.

47. Bauhinia.

TRIBE X. CYNOMETREE. Trees. Leaves even-pinnate, 2-\infty -folio-late. Calyx lobes divided to the disc, imbricate or valvate. Petals 5 or fewer or 0. Anthers versatile. Ovary 1-2-ovuled. Flowers usually small.

48. Cynometra.

TRIBE XI. AMHERSTIEE. Trees. Leaves even-, very rarely odd-pinnate,  $2-\infty$ -, rarely 1-foliolate. Calyx lobes divided to the disc, imbricate, very rarely valvate. Petals 5 or fewer or 0. Anthers versatile. Ovary  $3-\infty$ -ovuled, stalk adnate to the disc-bearing tube of calyx.

49. Tamarindus. Petals 3 perfect; stamens 3 perfect.

- 50. Sindora. Petal 1; leaves very corraceous; calyx-segments subvalvate.
- Afzelia. Petal 1; leaves papery; calyx-segments much imbricated.
- 52. Saraca. Petals 0; leaflets even-pinnate.
- 53. Crudia, Petals 0; leaflets alternate odd-pinnate.

TRIBE XII. EUCESALPINIEE. Trees, shrubs or large climbers. Leaves all 2-pinnate or, rarely, some leaves simply pinnate others 2-pinnate. Calyx lobes divided to the disc. Petals usually 5 slightly unequal. Anthers versatile. Ovary  $2-\infty$ -, rarely 1-ovuled, the stalk free in the calyx tube.

- 54. Peltophorum. Calyx-lobes subequal; pod winged along both sutures; stigma large peltate.
- 55. Casalpinia. Calyx-lobes unequal, the lowest large hooded; pod wingless.
- 56. Mezoneuron. Calyx-lobes unequal, the lowest large hooded; pod winged along upper suture.
- 57. Pterolobium. Calyx-lobes unequal, the lowest large hooded; pod samaroid, winged at the apex only.
- C. Suborder III. Mimoseæ. Flowers regular small. Calyx gamosepalous or valvately partite. Petals valvate, usually connate below the middle. Stamens free or monadelphous.

TRIBE XIII. PARKIEE. Trees. Leaves 2-pinnate. Calyx teeth short, imbricate. Stamens as many or twice as many as petals.

58. Parkia.

TRIBE XIV. ADENANTHEREE. Herbs, climbing shrubs or trees. Leaves 2-pinnate. Calyx valvate. Stamens twice as many, rarely only as many, as the petals. Anthers tipped by a stipitate gland.

Entada. Inflorescence a long spike; woody climbers with very

large pods and seeds.

Adenanthera. Inflorescence a long narrow raceme; trees. 60.

Neptunia. Inflorescence capitate; aquatic floating or creeping herbs.

Xylia. Inflorescence capitate; tall trees. 62.

TRIBE XV. EUMIMOSEÆ. Herbs, erect or climbing shrubs, or trees. Leaves 2-pinnate. Flowers 4-5-merous, rarely 3- or 6-merous. Calyx valvate or pappus-like, or 0. Stamens twice as many, or only as many, as the petals, free. Anthers not gland-tipped; pollen-granules many, distinct.

- Leucaena. Pod opening through the sutures, valves continuous; 63. shrubs or small trees.
- Mimosa. Pod with persistent sutures; valves segmented; shrubs or undershrubs.

TRIBE XVI. ACACIEÆ. Trees, shrubs or woody climbers. 2-pinnate. Flowers 4-5-merous, rarely 3-merous or 6-merous. Calyx valvate, very rarely 0. Stamens indefinite, often very numerous, free, or with the inner rows slightly subconnate at the base into a shallow ring; pollen-masses 2-6.

65. Acacia.

TRIBE XVII. INGER. Trees. Leaves 2-pinnate sometimes 2-3geminate, rarely simply pinnate. Flowers usually 5-merous. Calyx valvate. Stamens indefinite often numerous, rarely 10-15, united in a tube at the base or sometimes higher up; anthers small; pollen-masses 2-6.

Serianthes. Pod septate between the seeds, thick, woody, inde-66. hiscent; flowers large; trees.

Enterolobium. Pod septate between the seeds, spongy or fleshy, indehiscent; flowers small; trees.

68. Calliandra. Pod thin, straight with thickened sutures, dehiscing elastically; flowers small; trees or shrubs.

Albizzia. Pod thin, straight, dehiscent or indehiscent; flowers 69. small; trees or shrubs.

Pithecolobium. Pod coriaceous, curved, indehiscent or dehiscing through lower suture, or fleshy and dehiscing by both sutures; flowers small; trees.

## SUB-ORDER I. PAPILIONACEE.

Herbs or shrubs (often climbing), rarely trees. Leaves simple or digitately or pinnately compound; usually stipellate rarely even-pinnate. Inflorescence various, often racemose. Flowers irregular, usually hermaphrodite, rarely regular. Sepals 5, united beyond the disc in a campanulate or tubular calvx with a truncate, 5-toothed or 5-lobed limb, or with limb 4-toothed by union of the two upper segments or 2-lipped by similar union of three lower. Petals 5 imbricate or rarely spreading, the upper (standard) outer, two lateral (wings) usually overlying and free from or attached about the middle to the two lower inner rarely free usually connate below in a curved sheath (keel); petals rarely subsimilar and subequal. Stamens inserted with the petals on a disc lining the base of the calyx, usually 10 diadelphous in a sheath of 9 connate next keel with 1 free next standard, rarely in 2 lateral sheaths of 5 each; sometimes 9 by abortion of upper filament, or 5 by abortion of alternate stamens; occasionally 10, monadelphous, very rarely 10, free; anthers usually dehiscing longitudinally. Embryo with radicle usually inflexed, accumbent. Albumen 0 or very scanty.

Stamens mon- or di-adelphous:-Pods deniscent by both sutures :-Leaves even-pinnate the petiole ending in a bristle; stamens 9, the tenth abortive ... ... 1. ABRUS. Leaves odd-pinnate or simple, or digitately 3- or morefoliolate: -Leaves simple or digitately compound; (pods turgid): -Leaves simple, sessile, or digitately 3-7-foliolate; stamens monadelphous; seeds many 2. CROTALARIA. Leaves digitately 3-foliolate or, if 1-foliolate, petioled; stamens diadelphous; seeds 2 ... 3. FLEMINGIA. Leaves pinnately compound :-Leaves 3-foliolate (5-7-foliolate in one species of Clitoria) (PHASEOLEÆ except Flemingia):-Pods dehiscent from end to end :-Leaves glandular beneath; (pod compressed; stamens 9+1) (Cajaneæ except Flemingia):-Ovules 2; the 2 upper calyx-lobes almost free; (stigma small terminal; seed not strophiolate,) funicle attached to end of hilum ... 4. ERIOSEMA. Ovules 4 or more; the 2 upper calyx-lobes much connate; funicle centric: -Climbers; stigma small terminal; seeds strophiolate or sub-strophiolate:-Pod linear acuminate, hardly depressed between the seeds; funicle expanded but seeds not distinctly strophiolate

... 5. DUNBARIA

indierials for a reord of the recording		
Pod oblong obtuse, deeply transversely		
lineate between the seeds; strophiole		
large	6.	ATYLOSIA.
Woody undershrubs; stigma dilated. oblique;		
seeds not strophiolate; (pod acute deeply		
transversely lineate between the seeds)	7.	CAJANUS.
Leaves not glandular beneath, (leaflets stipel-		
late; climbing species except Erythrina):-		
Style bearded below the stigma; (stamens		
9+1) (Euphaseoleæ + Clitoria):-		
Stigma oblique:—	ų, i	
Keel spirally twisted	8.	PHASEOLUS.
Keel not spiral:		
	9.	VIGNA.
	10.	PACHYRHIZUS.
Stigma terminal:—		
Petals equal in length :-		
Pod flattish, not winged	11.	Dolichos.
Pod square, 4-winged	12.	PSOPHOCARPUS.
Petals very unequal, standard large;		
	13.	CLITORIA.
Style not bearded below the stigma:-		
Nodes of racemes not swollen (Glycineæ		
except Clitoria):-		
Petals very unequal, standard large;		
stamens 9+1, all fertile	14.	CENTROSEMA.
Petals subequal, all small; stamens mona-		
delphous, 5 fertile, 5 alternate sterile	15.	TERAMNUS.
Nodes of racemes swollen :-		
Stamens monadelphous; petals equal		
(Dioclex):		·
Upper lip of calyx not projecting:-		
Pod oblong, turgid, 1-2-seeded	16.	DIOCLEA.
	17.	PUERARIA.
	18.	CANAVALIA.
Stamens diadelphous (9+1); petals very		
unequal (Erythrineæ):-		
Anthers dimorphous; keel exceeding		
	19.	MUCUNA.
Anthers uniform :—		
Keel and standard equal, wings very		
		STRONGYLODON.
Keel and wings both shorter than		
	21.	ERYTHRINA.
Pods dehiscent at the seed-bearing apex only, else-		
where seedless and indehiscent:—		
Armed trees, keel and wings shorter than standard	21.	
		§ Hypaphorus.
Unarmed climbers; petals equal	22.	SPATHOLOBUS.

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Leaves pinnately 5-∞ -foliolate; (1-foliolate in some
       species of Tephrosia):-
         Anthers apiculate; hairs centrally fixed; (stamens
                                                         ... 23. Indigofera.*
        diadelphous, 9+1)
                                  •••
         Anthers obtuse : hairs basifixed :-
           Pods transversely septate between the seeds;
                                                         ... 24. SESBANIA.
           (stamens diadelphous, 9+1)
          Pods not septate; (stamens 9+1, the upper often
          united in the middle to the staminal sheath) :-
            Leaflets closely parallel-veined; pod thin early
                                                        ... 25. TEPHROSIA.
            dehiscent ; leaves sometimes 1-3-foliolate
            Leaflets reticulate-veined; pod thick, tardily
                                                        ... 26. MILLETTIA.
            dehiscent ...
Pods indehiscent or, rarely, opening (some Desmodia) along
the lower suture :--
  Pod not segmented; (always indehiscent):-
    Leaves odd-pinnate; trees or strong woody climbers :-
      Leaflets opposite:-
        Stamens monadelphous, the vexillary filament united
        in the middle to the staminal sheath; pod thickly
        coriaceous or woody; (calyx truncate):-
          Pod wingless ...
                                                        ... 27. PONGAMIA.
          Pod winged ...
                                                        ... 28. DERRIS.
                                             ---
        Stamens quite diadelphous, 9+1:-
          Pod winged; calyx truncate
                                                        ... 28. DERRIS
                                                               § AGANOPE.
          Pod wingless; calyx toothed
                                                        ... 29. KUNSTLERIA.
     Leaflets distinctly alternate:-
        Flowers small, pods narrow
                                                       ... 30. DALBERGIA.
        Flowers large, pods suborbicular
                                                       ... 31. PTEROCARPUS.
   Leaves even-pinnate, the rachis ending in a bristle, herbs
   with hypogral fruits ...
                                                       ... 32. ARACHIS.
 Pod of several (rarely 1) indehiscent 1-seeded segments (in
 Desmodium § Nicholsonia dehiscing along the lower suture)
 (HEDYSARE except Arachis):-
   Leaves exstipellate :--
     Stamens monadelphous, anthers dimorphous; leaves
     digitately 2-4-foliolate; (joints of pod muricated) ... 33. ZORNIA.
     Stamens diadelphous in 2 bundles of 5 each; anthers
     uniform; leaves pinnate (Aeschynomeneæ); (joints of
     pod papillose or weakly muricated, rarely smooth) :-
       Leaves even-pinnate, end-leaflet replaced by a
       bristle; pod folded together within the calyx
                                                       ... 34. SMITHIA.
       Leaves odd-pinnate; pod straight exserted :-
         Calyx 5-toothed; ovary sessile, ovales few, joints
         of pod oblong
                                                       ... 35. ORMOCARPUM.
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<sup>\*</sup> None of the simple-leaved or subdigitately-leaved species of Indigofera are reported from the Malay Peninsula.

Calyx deeply 2-lipped; ovary stalked, ovules many; joints of pod suborbicular or quadrate ... 36. A ESCHYNOMENE. Leaves stipellate; (stamens 9+1, anthers uniform):-Ovary 1-ovuled; (leaves pinnately 3-foliolate) ... 37. PHYLACIUM. Ovary 2- or more-ovuled :--Pod folded together within the calyx :--Calyx-teeth setaceous, not accrescent ... 38. URARIA. Calyx-teeth lanceolate, accrescent ... ... 39. LOUREA. Pod straight exserted :-Joints of pod coriaceous about as thick as they are broad and long ... 40. ALYSICARPUS. Joints of pod thin, or if coriaceous (§ Dendrolobium) much broader than thick, and if as thick as broad (§ Scorpiurus) much longer than broad; opening along lower suture in § Nicholsonia and in § Pleurolobium ... 41. DESMODIUM. Stamens free :-Stigma terminal, pod long moniliform .. 42. SOPHORA. Stigma oblique, pod short turgid ...

#### 1. ABRUS Linn.

... 43. ORMOSIA.

Climbing shrubs. Leaves with numerous deciduous leaflets. Flowers small, in dense racemes on axillary peduncles or short branches. campanulate, equal; teeth very short. Corolla much exserted; standard ovate, acute, adhering below to the staminal tube; wings narrow; keel Stamens 9, united in a tube slit above, the tenth absent; anthers uniform. Ovary subsessile, many-ovuled; style short, incurved, beardless, stigma capitate. Pod oblong or linear-oblong, flat or turgid, moderately firm, thinly septate. Species 5; cosmopolitan in the tropics.

Pod oblong turgid 3-5-seeded ... 1. A. precatorius. Pod linear flat incurved 8-12-seeded ... 2. A. pulchellus.

ABRUS PRECATORIUS Linn. Syst. Veg. ed. XII, 472. A copiously branched climber with thin stems and slender glabrous or thinly silky Leaves 2-3 in. long; leaflets equally pinnate in 10-20 opposite pairs membranous glabrous above thinly silky beneath, green deciduous, ligulate-oblong 35-65 in. long, 15-2 in. wide. Racemes many-flowered, crowded, usually shorter than the leaves, rachis usually distinctly thickened in fruit. Calyx 1 in. thinly silky. Corolla 5 in. pink, or white with pink tinge. Pod oblong, turgid, 1-15 in. long, ·4-5 in. wide, valves rugose thickened, 3-5-seeded. Seeds various, usually bright scarlet with black hilum in wild specimens; sometimes white with black hilum, uniformly white, or uniformly black in cultivated forms. DC. Prodr. II, 381; Roxb. Flor. Ind. III, 258; Wall. Cat., 5818; Miq. Flor. Ind. Bat. I, 158; Bak. in Flor. Brit. Ind. II, 175. A. minor Desv. Ann. Sc. Nat. IX, 418. A. pauciflorus Desv. Ann. Sc. Nat. IX, 418.

Andamans; very common from the Coco Group to Little Andaman; Barren Island. NICOBARS; common. Penang; Wallich! Curtis! Pangkore; Scortechini! Pahang; Ridley! Distrib. Cosmopolitan in the

tropics.

2. ABRUS PULCHELLUS Wall. Cat. 5819. A copiously branched climber with thin stems and slender glabrous or thinly silky branches. Leaves 3-4 in. long; leaflets equally pinnate in 12-16 opposite pairs, membranous glabrous above thinly silky beneath, green deciduous, ligulate oblong '75-1'25 in. long, '25-'35 in. wide. Racemes manyflowered, usually lax always long-peduncled, equalling or exceeding the leaves; rachis little thickened in fruit. Calyx '1 in. thinly silky. Corolla '5 in. pink, or pale blue. Pod linear flat incurved 2-2'5 in. long, '5 in. wide, valves smooth thin, 8-12 seeded. Thwaites, Enum. Pl. Zeyl. 91; Bak. in Flor. Brit. Ind. II, 175. A. lævigatus E. Mey. Comm. I, 126; Harv. Fl. Cap. II, 263. A. melanospermus Hassk. Cat. Bog. 282; Miq. Flor. Ind. Bat. I, 159. A. acutifolius Blume MSS. ex Miq. Flor. Ind. Bat. I, 160.

Andamans; Coco Group, Prain! Port Blair, common. Perak; Kunstler 1023! Scortechini 630! Distrib. S. Africa and S.-E. Asia.

#### 2. CROTALARIA Linn.

Herbs or shrubs with simple or digitately 3-foliolate rarely 5-7-foliolate leaves. Flowers often large and showy in terminal or leaf-opposed racemes. Calyx with short tube, and with lanceolate or linear teeth free or somewhat connate in two lips. Corolla equalling or exceeding the calyx; standard rounded or ovate short-clawed; wings obovate or oblong shorter than standard; keel as long as wings, its petals united, much incurved and beaked. Stamens monadelphous in a sheath split dorsally, anthers dimorphous, alternately on short filaments versatile and on longer basifixed. Ovary sessile or, rarely, stipitate linear usually many-ovuled; style long, abruptly incurved at the base, bearded above, stigma oblique small. Pod sessile or, rarely, supported on a gynophore oblong or linear, straight, turgid or inflated, continuous within, 2- $\infty$ -seeded. Species about 250, widespread in tropical and sub-tropical regions.

Leaves simple :-

Stipules decurrent as a persistent wing to the stem ... 1. C. alata.

Stipules, if present, not decurrent :—
Pods not longer than the calyx :—

Flowers in elongated racemes, petals blue; stipules minute

Flowers in short few-fld. heads, petals pale yellow; stipules 0

... 2. C. sessiliflora

... 3. C. chinensis.

	Pods much longer than the calyx:-			
	Pods glabrous, flowers yellow:-			
	Stems diffuse, racemes lateral		4	C. ferruginen.
	Stems erect, racemes terminal:-	***	· ·	o. jerruginen.
	Branches stout striated, glabrous or nearly	80.		
	leaves stipellate:-	, va		
	Leaves obtuse or retuse, bracts and stipp	iles		
	small subulate		5.	C. retusa.
	Leaves acute, bracts and stipules large ac	nte	· ·	o. recusu.
	and leafy		6.	C. sericea.
	Branches slender terete, densely silky; lea	ves	٠.	o. ber stete.
	exstipellate	Sec. 1	7 6	C. albida.
	rous nirsute, flowers usually blue, racemes late	ral	```	o. atotate.
	as well as terminal		8	7. verrucosa.
	ves compound:-	•••		or verracosu,
I	Leaves 3-foliolate:-			
	Pods small, obliquely subglobose, very few-seed	eď		
	(nirsute)			. uncinella.
	1 ous raige, cylindric, many-seeded :			
	Pods hirsute (narrowly cylindric almost sessile)	10	). C	incana.
	- cab grapious :—			
	Pods plane granutal	11	. 0	. Saltiana.
т.	tous voicing, supported on a long grownham	10	. 0	. laburnifolia.
fo	eaves usually 5-foliolate (at times 3-, 4-, or even 6-	7-		
	•••	13	. 0	. quinquefolia.
_ ]	L. CROTALARIA ALATA Ham in Royh Hand D.			

ALARIA ALATA Ham. in Roxb. Hort. Beng. 98. A suberect undershrub 1-2 feet high; stem and leaves below clothed with short silky pubescence. Leaves 1-3 in. long, simple, oblong-ovate or obovate, subacute or obtuse, membranous, the stipules with lanceolate-dentate points forming decurrent wings on the stem for nearly the whole length of the nodes. Racemes 2-3-fld., on elongated often leafy lateral peduncles; bracts small, persistent, ovate, acuminate. Calya densely silky, ·35 in. long, tube campanulate, bracteolate. Corolla pale-yellow hardly exserted. Pod distinctly stalked 1.25-1.75 in. long, linear-oblong, glabrous, 30-40-seeded. Don, Prodr. 241; Roxb. Flor. Ind. III, 274; DC. Prodr. II 124; Wall. Cat. 5356; Benth. in Hook. Lond. Journ. II, 478; Miq. Flor. Ind. Bat. I, 329; Bak. in Flor. Brit. Ind. II, 69. C. sagitticaulis Wall. Cat. 5357. C. bialata Roxb. Flor. Ind. III, 274.

SINGAPORE; Changi, Hullett! Ridley! DISTRIB. Himalaya; Indo-China; Malay Islands.

2. CROTALARIA SESSILIFLORA Linn. Sp. Pl. ed. 2, 1004. A rigid erect annual 1-2 feet high, simple or sparingly fastigiately branched, stem and leaves below shortly silky. Leaves 2-6 in, long, simple linear or lanceolate narrowed to both ends thickly herbaceous, quite glabrous above, the stipules setaceous very small. Racemes 1-8 in. long, 5-20fld., terminal; flowers deflexed close-set (occasionally solitary flowers occur also in the axils of the uppermost stem-leaves); bracts long, setaceous, persistent. Calyx densely silky with very long hairs, '35-5 in. long, tube shortly campanulate, teeth all long acute, the upper lanceolate, narrow. Corollu blue and white, rarely yellow, glabrous, not exserted. Pod sessile '5 in. long, not exserted, oblong, glabrous, 10-15-seeded. DC. Prodr. II, 129; Benth. in Hook. Lond. Journ. II, 565; Miq. Flor. Ind. Bat. I, 338; Bak. in Flor. Brit. Ind. II, 73. O. anthylloides Lamk. Encyc. Meth. II, 195; Don, Prodr. 241; Wall. Cat. 5366 A (partly), B, C. C. salicifolia Ham. in Don, Prodr. 241 not of Heyne. C. nepalensis Link, Enum. II, 228. C. venusta Wall. Cat. 5365. C. brevipes Champ. in Hook. Kew Journ. IV, 44. O. eriantha Sieb. & Zucc. Fl. Jap. 13. C. Oldhami Miq. Ann. Mus. Lugd. Bat. III, 42. C. calycina Kurz, Journ. As. Soc. Beng. XLV, pt. 2, 147 not of Schrank.

Malaya Peninsula; Pahang, Ridley! Nicobars; Kamorta, Kurz! Distrib. Japan, China, Indo-China, Philippines, Java; Himalayas from Assam westward; Panjab, Central India and Behar.

The specimens collected by Mr. Kurz in Kamorta having yellow flowers were referred by him to C. calycina. An examination however shows that they are not calycina but sessiliflora. A gathering from Java has been issued from Mus. Leyden, also under the name C. calycina; this probably indicates that in Java as in the Nicobars, C. sessiliflora may have yellow flowers.

3. Crotalaria chinensis Linn. Sp. Pl. ed. 2, 1003. An annual 1-2 feet high, usually breaking into several stoutish ascending branches from near the base, laxly silky with reddish brown hairs. Leaves 1-2 in. long, simple, linear to oblanceolate with rounded base and obtuse or subacute apex, thickly herbaceous laxly silky on both surfaces; stipules 0. Racemes densely capitate 3-6-fid., all terminal, bracts and bracteoles linear, persistent. Calyx laxly silky, 35-5 in. long, tube very short, teeth all long acute, the upper lanceolate, lower linear. Corolla pale-yellow, glabrous, not exserted. Pod sessile 5 in. long, not exserted, oblong, glabrous, 15-20-seeded. DC. Prodr. II, 130; Benth. in Hook. Lond. Journ. II, 566; Miq. Flor. Ind. Bat. I, 339; Bak. in Flor. Brit. Ind. II, 73.

Perak; Larut river; on rocks in the stream, Wray! DISTRIB. China, Indo-China, Philippines; India; Malay Islands.

4. CROTALARIA FERRUGINEA Grah. in Wall. Cat. 5398. A diffuse copiously branching herb with a perennial rootstock, finely silky or shaggy, branches 1.5-2 feet long. Leaves very short petioled, herbaceous 1.5-2 in. long, 5-75 in. across, simple, ovate-oblong obtuse paler beneath; stipules persistent foliaceous deflexed or spreading, 25 in. long; petioles 15 in. long. Racemes laxly 2-8-fid. leaf-opposed, 2-4 in. long, bracts linear 2 in. long often deflexed, pedicels very short. Calyx

laxly silky with rusty hairs, 5 in long, tube very short, upper teeth lanceolate lower linear. Corolla yellow not exserted. Pod shortly stalked 1-1.25 in. long glabrous 20-30-seeded. Benth. in Hook. Lond. Journ. II, 476; Bak. in Flor. Brit. Ind. II, 68. C. canescens Wall. Cat. 5415. C. crassifolia Ham. in Wall. Cat. 5416. C. leioloba Bartl. Ind. Sem. Hort. Goett. 1837; Linnæa XII, Litt. 80. C. pilosissima Miq. Flor. Ind. Bat. I, 327.

Pahang; Katepong Pekan, Ridley! DISTRIB. India, Indo-China, China; Malay Archipelago.

Mr. Ridley has kindly sent the writer for inspection, from the Singapore Herbarium, the only specimen of this species hitherto collected in the Malay Peninsula. The plant is, however, quite common in Sumatra and Java and may yet be found elsewhere in the Peninsula.

5. CROTALARIA RETUSA Linn. Sp. Pl. 715. An erect robust undershrub 3-4 feet high, with stout striated glabrous branches. 1.5-3 in. long, simple, short-petioled, thickly herbaceous, glabrous above puberulous beneath, oblong-oblanceolate, obtuse or oftener retuse, rarely subacute at apex, cuneate at base, stipules subulate very small. Rucemes terminal elongated 6-8 in. long laxly 12-20-fld., bracts and bracteoles subulate, pedicels shorter than calyx. Calyx almost glabrous, ·35-5 in., tube short campanulate, half the length of the lanceolate teeth. Corolla 8 in. long, much exserted, yellow with purple tinge. Pod glabrous linear-oblong, 1-1.5 in., distinctly stalked, 15-20-seeded. DC. Prodr. II, 125; Roxb. Flor. Ind. III, 272; Bot. Reg. t. 253; Bot. Mag. t. 2561; Wall. Cat. 5405; W. & A. Prodr. 187; Miq. Flor. Ind. Bat. I, 330; Bak. in Flor. Brit. Ind. II, 75. Impinus cochinchinensis Lour. Flor. Cochinch. 429; DC. Prodr. II, 410. Tandale-cotti Rheede, Hort. Malab. IX, t. 25.

Malay Peninsula; Malacca, Maingay! Hervey! Pahang, Ridley! Andamans; Port Blair, very common; having been introduced as a plant of native gardens, it has now run wild throughout the settlement. -DISTRIB. General in the tropics.

6. CROTALARIA SERICEA Retz, Obs. V, 26. A robust undershrub 3-4 feet high with stout striated almost glabrous branches. Leaves 2-6 in. long, simple, short petioled, thickly herbaceous, glabrous above, finely silky beneath, oblong-oblanceolate acute or subacute at apex, cuneate at base; stipules large leafy persistent. Racemes terminal elongated 10-12 in. long, laxly 20-50-fld., bracts ovate leafy persistent, pedicels longer than calyx. Calyx almost glabrous 5 in. long, tube short campanulate half the length of the lanceolate teeth. Corolla 8 in. long, much exserted, yellow with purple tinge. Pod glabrous linearoblong 1-2 in. long, distinctly stalked 20-30-seeded. DC. Prodr. II,

126; Roxb. Fl. Ind. III, 273; Wall. Cat. 5406; W. & A. Prodr. 186; Miq. Flor. Ind. Bat. I, 330; Bak. in Flor. Brit. Ind. II, 75. C. spectabilis Roth, Nov. Sp. 341; DC. Prodr. II, 125. C. macrophylla Weinm. Syll. II, 26. C. cuneifolia Schrank, Syll. II, 78.

MALAY PENINSULA; Malacca, Griffith. Andamans; Table Island, Prain! DISTRIB. India and Indo-China.

Very like the preceding, but easily distinguished, even in those cases where the foliage is similar, by the large stipules and bracts.

7. CROTALARIA ALBIDA Heyne ex Roth, Nov. Sp. Pl. 333. An undershrub 1-2 feet high with numerous firm slender terete obscurely silky branches. Leaves simple linear or oblanceolate obtuse firm shining gland-dotted glabrescent above, thinly silky beneath, 1-2 in. long '2-25 in. wide, petiole '1 in., stipules O. Flowers in terminal, or rarely lateral, laxly 6-20-fld. racemes, 2-4 in. long; bracts linear '05-1 in. long; pedicels '15-2 in. long slender adpressed-puberulous. Calyx turbinate '25 in. long, in fruit '35 in. long, thinly silky; teeth long the 3 lower linear acuminate, the 2 upper broader often subobtuse. Corolla pale yellow glabrous '3 in. long. Pod glabrous sessile, oblong-cylindric '5-6 in. long, half as long again to twice as long as calyx; seeds 6-12. W. & A. Prodr. 189; Bak. in Flor. Brit. Ind. II. 71. C. montana Roxb. Hort. Beng. 54; Flor. Ind. III, 265; W. & A. Prodr. 182. C. scoparia Wall. Cat. 5418. C. parva Grah. in Wall. Cat. 5402. C. punctata Grah. in Wall. Cat. 5401 A, 5401 C. C. tennis Wall. Cat. 5403.

Selangon; roadsides at Kwala, Ridley 7293! DISTRIB. Throughout South Eastern Asia.

A species perhaps only recently introduced to the Malay Peninsula from India; in India and Indo Chiua the plant is very common in grassy places.

8. CROTALARIA VERRUCOSA Linn. Sp. Pl. 715. A woody herb 2-3 feet high with many angular branches puberulous at first but soon glabrescent. Leaves 2-6 in. long, simple short petioled, thin, obscurely downy beneath, ovate, obtuse or occasionally acute at apex, deltoid at base; stipules moderately large leafy semilunate. Racemes terminal and lateral, about 6 in. long, rather closely 12-20-fid., bracts linear minute, pedicels about as long as calyx. Calyx 3 in. long, obscurely downy, tube short campanulate, half the length of lanceolate teeth. Corolla 75 in. long, exserted, usually white and blue, often white, occasionally yellow. Poils faintly hirsute, oblong, 1-1.5 in. long, distinctly stalked, 10-15-seeded. DC. Prodr. II, 125; Bot, Mag. t. 3034; Wall. Cat. 5392; W. &'A. Prodr. 187; Wight Ic. t. 200; Miq. Flor. Ind. Bat. I, 331 Bak. in Flor. Brit. Ind. II, 77. C. angulosa Lamk. Encyc. Meth. II, 197; Roxb. Flor. Ind. III, 273. C. cærulea Jacq. Ic. t. 144. C. acuminata G. Don., Dict. II, 134.—Rheede, Hort. Malab. IX, t. 29.

MALAY PENINSULA; Perak, Scortechini! Malacca, Griffith. Pahang, Ridley!

9. CROTALARIA UNCINELLA Lamk. Encyc. Meth. II, 200. An almost stemless undershrub with several subprocumbent slender flexuous spreading branches 1-2 feet long, slightly puberulous. Leaves compound 3-foliolate, petioles 1 in. long, leaflets subequal or the terminal slightly the larger, 1-1.5 in. long, 5-75 in. wide, glabrous above slightly hirsute beneath, elliptic obtuse entire; stipules small, acute, rigid, recurved, glabrous above hirsute beneath. Racemes lateral and terminal 2 in. long, 20-25-fld.; flowers close-set, bracts small recurved ovate acuminate. Calyx hirsute 15 in. long, teeth lanceolate. Corolla 25 in. long, exserted, yellow, glabrous. Pod obliquely subglobose, closely adpressed-pubescent, 2-seeded; style sharply hooked. Lamk. Ill. t. 617, f. 2. C. elliptica Roxb. Hort. Beng. 54; Flor. Ind. III, 279; Mig. Flor. Ind. Bat. I, 344; Benth. in Hook. Lond. Journ. II, 580; Flor. Hongk. 75; Forbes & Hemsl. Ind. Sinens., I, 151. C. Vachellii H. & A. Bot. Beech. Voy. 180; Walp. Rep. I, 588. Rhynchosia aurea Ridl. Trans. Linn. Soc., Ser. II, III, 293 not of DC.

Malay Peninsula; Pahang, Ridley! Malacca, Derry! Goodenough! Distrib. China.

First described by Lamarck from specimens received by him from Mauritius; probably the plant had been there introduced; at all events Mr. Baker does not cite it, even as a stranger, in his Flora of Mauritius. Afterwards described, independently, by Roxburgh, from specimens reared in the Calcutta garden, and therefore, though issued by Wallich, deliberately excluded from the Indian Flora by Wight and Arnott, who have been in this followed by Baker in the Flora of British India. Its discovery in Pahang by Mr. Ridley, in whose list it stands as Rhynchosia aurea, and in Malacca where it is apparently quite common, shows that after all it deserves to be included in the Indian Flora.

10. Crotalaria incana Linn. Sp. Pl. 716. An erect undershrub 2-4 feet high with robust terete loosely downy branches. Leaves compound 3-foliolate petioles 2-3 in. long, leaflets membranous, quickly glabrescent above sparsely hirsute beneath terminal 1.5-2 in. long, larger than lateral all ovate, obtuse at apex and rounded or widely cuneate at base; stipules minute setaceous. Racemes terminal and lateral 6-10 in. long, rather closely 12-20-fld., bracts minute. Calyx 25 in. long, loosely downy, teeth lanceolate twice as long as the tube. Corolla 6 in. long, exserted, yellow, glabrous. Pod subsessile slightly effexed and slightly recurved, cylindric 1-1.25 in. long, permanently pubescent with spreading brown silky hairs; 20-30-seeded. DC. Prodr. II, 132; Bot. Reg. t. 377; Miq. Flor. Ind. Bat. I, 347; Bak. in Flor. Brit. Ind. II, 83. C. Schimperi A. Rich. Fl. Abyss. I, 151. C. herbacea Schweig. in Schrank, Syllog. Ratisb. II, 77.

Penang; Curtis! Distrib. Cosmopolitan in the tropics, originally American.

There is one specimen of this in Mr. Curtis' own Herbarium. No other collector has sent it from Malaya.

11. CROTALARIA SALTIANA Andr. Bot. Rep. t. 648. An erect shrub 2-4 feet high with robust smooth or slightly sulcate thinly silky branches. Leaves compound, 3-foliolate, petioles 2-3 in long, leaflets membranous, glabrous above very sparingly silky below, terminal 1·5-2·5 in. long, larger than lateral, all obtuse cuneate at base; stipules minute, deciduous. Racemes terminal and occasionally also lateral, usually 1-1·25 feet long, laxly 20-50-fid.; bracts minute. Calyx ·25 in. long, thinly silky; teeth lanceolate as long as campanulate tube. Corolla ·6 in. long, exserted, yellow with purple stripes or pure yellow, glabrous. Pod subsessile deflexed, subrecurved puberulous when young, ultimately glabrous, cylindric, 1·5 in. long, 20-30-seeded. C. striata DC. Prodr. II, 131; Miq. Flor. Ind. Bat. I. 346; Bak. in Flor. Brit. Ind. II, 84 (excluding the synonyms C. Brownei Bertero and C. latifolia Roxb.)

MALAY PENINSULA; Perak, Wray! Scortechini! Penang, King!

Malacca, Maingay! Singapore, Kunstler! Pahang, Ridley.

Nearly related to, and at times mistaken for C. Brownei Bertero ex DC. in Prodr. II, 130 (C. lanceolata Roxb. Hort. Beng. 54 [nomen prius] nec Meyer; C. latifolia Roxb. ex Wall. MSS. in Hort. Calcutta) a native of the West Indies, but now occasionally met with as a spontaneous species in India. From C. Saltiana, C. Brownei differs in having more numerous lateral racemes, with flowers always close-set and racemes never exceeding 6 in., and in having much larger leaflets acute at apex as well as base and more densely silky underneath. The leaves of C. Saltiana are like those of the next species; of C. Brownei like those of C. bracteata and of Priotropis cytisoides for both of which species it has, at times, been mistaken.

CROTALARIA LABURNIFOLIA Linn. Sp. Pl. 715. An erect shrub 2-4 feet high with long slender rounded glabrous branches. Leaves compound, 3-foliolate, petioles 2-3 in. long, leaflets membranous, glabrous on both surfaces, terminal 1-2 in. long, hardly larger than lateral, all subacute or obtuse, cuneate at the base; stipules 0. Racemes terminal and lateral 6-12 in. long, few- and very lax-fld.; bracts minute deciduous, pedicels 5 in. long. Calyx 3-4 in. long, glabrous turbinate, teeth lanceolate as long as tube. Corolla 1 in. long, much exserted, pure yellow, glabrous, keel much incurved. Pod pendulous from a filiform gynophore 75-1 in. long, glabrous, cylindric 1.5-2 in. long, 20-30seeded. DC. Prodr. II, 130; Roxb. Fl. Ind. III, 275; Wall. Cat. 5424, mostly; W. & A. Prodr. I, 193; Miq. Flor. Ind. Bat. I, 345; Bak. in Flor. Brit. Ind. II, 84. C. pendula Bert. in DC. Prodr. II, 130. C. pedunculosa Desv. Journ. Bot. III, 76; DC. Prodr. II, 132. Clavulium pedunculosum Desv. Ann. Sc. Nat. IX, 407. Nellia-tandalecotti Rheede, Hort. Malabar. IX, t. 27.

MALAY PENINSULA; Malacca, Griffith! Maingay! Hervey! DISTRIB.

India; Malay Archipelago; Philippines.

13. CROTALARIA QUINQUEFOLIA Linn. Sp. Pl. 716. An erect annual 2-4 feet high with straight robust sulcate fastigiate sparingly silky branches. Leaves digitate normally 5-foliolate, at times 3-, 4-, or even 6-7-foliolate, petioles 1-3 in. long, leaflets herbaceous, glabrous above, thinly silky beneath, central largest 2-4 in. long, all linear or occasionally narrowly oblanceolate obtuse; stipules linear. Racemes terminal, 6-8 in. long, laxly 8-20-fld.; bracts linear as long as pedicels, thinly silky, persistent; lower pedicels as long as calyx, upper short. Calyx subglabrous 5 in. long; teeth lanceolate as long as campanulate tube. Corolla 1 in. long, glabrous, yellow, white or rarely purplish. Pod distinctly stalked subinflated, glabrous, 1.5-2 in. long, .75 in. wide, 30-40-seeded. DC. Prodr. II, 135; Roxb. Flor. Ind. III, 279; Wall. Cat. 5429; W. & A. Prodr. I, 194; Wight Ill, t. 16; Miq. Flor. Ind. Bat. I, 347; Bak. in Flor. Brit. Ind. II, 84. C. heterophylla Linn. f. Suppl. 323; DC. Prodr. II, 131.

MALAY PENINSULA; Kedah, Kunstler! Singapore, Hullett! DISTRIB. India; Indo-China; Malay Archipelago; Philippines.

## 3. FLEMINGIA Roxb.

Shrubs, rarely herbs, with leaves digitately 3-foliolate or simple, gland-dotted below. Inflorescence various; pedicels very short, not bracteolate. Calyx-tube short; teeth narrow, acuminate, the lowest often the longest. Corolla little or not at all exserted; petals equal in length; keel obtuse or slightly rostrate. Stamens diadelphous; anthers uniform. Ovary subsessile, 2-ovuled; style filiform, beardless, stigma capitate. Pod oblong, turgid, small, usually two-seeded; seeds not strophiolate, the funicle centrical. Species about 25; 3 Tropical African, the remainder Asiatic.

Leaves 1-foliolate; flowers in small cymes hidden by large folded persistent bracts and arranged in racemes longer than the leaves ... ... ... ... ... 1. F. strobilifera. Leaves 3-foliolate; flowers in simple solitary or fascicled axillary racemes shorter than the petioles, bracts small deciduous ... ... ... 2. F. congesta.

§ OSTRYODIUM Desv. Shrubs. Leaves simple. Flowers in small symes, each hidden by a large folded persistent bract, closely distichously arranged in copious simple or slightly branched racemes, both in the axils of the leaves and above them.

1. Lemingia strobilifera R. Br. in Ait. Hort. Kew. ed. II, IV, 350. An ere at shrub 5-10 feet high with slender terete branches velvety towards the eir tips. Leaves 4 in long, petioles 5 in long, adpressed 42

puberulous; leaflets 1, subcoriaceous green glabrescent above thinly silky on the nerves beneath, ovate-acute, base widely rounded or truncate 3·5 in. long, 2 in. wide, lateral nerves 10–12 pairs; stipels obsolete, stipules scarious lanceolate 3 in. long. Inflorescence in terminal racemes or thyrses 3-6 in. long, the slender zigzag rachis rusty-pubescent; bracts erecto-patent, short-petioled, deeply cordate 1 in. long, 1·25 in. wide, membranous, apex shortly cuspidate in all except the very uppermost. Calyx 25 in. finely pilose; teeth lanceolate, exceeding the tube. Corolla yellowish or greenish-white 35 in. long. Pod oblong turgid 35 in. long, finely downy; 2-seeded. DC. Prodr. II, 351; Wall. Cat. 5753; W. & A. Prodr. 243; Wight Ic. t. 267; Miq. Flor. Ind. Bat. I, 161; Bak. in Flor. Brit. Ind. II, 227 (excluding both varieties). F. abrupta Wall. Cat. 5755. Hedysarum strobiliferum Linn. Sp. Pl. 746; Roxb. Flor. Ind. III, 350. Zornia strobilifera Per. Synops. II, 319.

In all the provinces, common. DISTRIB. Throughout S.-E. Asia.

§ 2. FLEMINGIASTRUM DC. Erect shrubs. Leaves digitately 3-foliolate. Flowers in dense subspicate axillary racemes; bracts linear or lanceolate, caducous.

2. FLEMINGIA CONGESTA ROXB. Hort. Beng. 56. An erect woody shrub 4-6 feet high with slender triangular sulcate branches silky towards their tips. Leaves 6-9 in. long, petioles 2.5-3.5 in. long, adpressed puberulous margins angled but hardly winged; leaflets 3, subcoriaceous, ovate-acute, terminal cuneate lateral obliquely round at base, green, puberulous above thinly rusty silky especially on the nerves beneath, 3-5 in. long, 1.5-3 in, wide, lateral nerves 5-7 pairs, the lowest pair long, very oblique, arising at junction of midrib and petiolule, stipels obsolete, petiolules 25 in. long, stipules scarious externally velvety, early caducous '4 in. long. Inflorescence in dense axillary racemes sometimes solitary in the higher, usually fasciculate in the lower axils, 2 in long, always shorter than petioles; bracts lanceolate 25 in. long or less. silky externally less rigid than the stipules and like them deciduous. Calyx 35 in. long, densely silky externally, teeth linear-lanceolate the lowest exceeding the others. Corolla wings purple standard white striped with pink 4 in. long. Pod oblong 5 in. long, 25 in. wide, closely shortly tomentose; seeds 2. Roxb. Fl. Ind. III, 340; DC. Prodr. II. 351; W. & A. Prodr. 241; Wight, Ic. t. 390; Wall. Cat. 5747; Mig. Flor. Ind. Bat. I, 164; Bak. in Flor. Brit. Ind. II, 288, excluding all the varieties. Crotalaria macrophylla Willd. Sp. Pl. III, 982. Rhynchosia crotalarioides DC. Prodr. II, 387.

Penang; Wallich 5747 F! Pulo Beeting, Curtis 1926! Malacca; Griffith! Pangkore, Goodenough! Perak; Larut, Scortechini 134! Kampong Kota, Wray 3316! DISTRIB. India, Indo-China, Java.

### 4. ERIOSEMA DC.

Shrubs or herbs, mostly subcrect, with 1-3-foliolate leaves. Flowers racemed or axillary. Calyx campanulate; teeth 5, as long as the tube. Corolla distinctly exserted; limb of standard roundish, auricled at the base; wings and slightly beaked keel shorter. Stamens diadelphous; anthers uniform. Ovary sessile, 2-ovuled; style filiform, glabrous, stigma capitate. Pod oblong, turgid, 1-2-seeded; seeds oblique, the funiculus attached to the extremity of a linear hilum. Species about 50, mostly Trop. African and American.

ERIOSEMA CHINENSE Vogel. Pl. Meyen. 31. An erect undershrub 1-1.5 feet high, stems slender branching virgately usually near base, densely pubescent one or more from a small tuberous woody rootstock 1.5 in. long, .75 in. across. Leaves 1-2 in. long, .3-4 in. across, 1-foliolate very short petioled, linear-oblong to linear-lanceolate, subcoriaceous, greenish with a few adpressed hairs above densely grey-tomentose beneath, the veins rusty brown tomentose; stipules linear scarious 2-nerved persistent 2 in. long, stipels minute. Flowers in axils of upper leaves, solitary or geminate subsessile or on a common pedicel, sometimes 5 in. long jointed below flower, bracteoles obsolete. Calyx campanulate densely pilose 2 in. long. Corolla yellow, drying black, 4 in. long, standard orbicular hairy externally. Pod oblong '4 in. long, pubescent with long spreading rufous hairs. Bak. in Flor. Brit. Ind. II, 219. Crotalaria tuberosa Ham. in Don. Prodr. 241. Rhynchosia virgata Grah. in Wall. Cat. 5503. R. Grahami Wall. Cat. 5504. Pyrrotricha tuberosa W. & A. Prodr. 238.

PERAK; Wray n. 3804! MALACCA; Griffith. DISTRIB. S.-E. Asia; N. Australia.

## 5. DUNBARIA W. & A.

Woody or herbaceous climbers. Leaves 3-foliolate, distinctly gland-dotted beneath; stipellæ rarely present. Flowers racemose or axillary. Calyx teeth narrow the lowest distinctly exceeding the others. Corolla exserted, marcescent or caducous; keel usually not beaked. Stamens diadelphous anthers uniform. Ovary sessile or stalked, many-ovuled; style inflexed filiform beardless, stigma capitate. Pod linear, flat not marked with depressed lines between the substrophiolate seeds. Species about 12, Eastern Asiatic, Japanese and North Australian; only one from our area.

§ RHYNCOLOBIUM. Corolla caducous.

DUNBARIA SCORTECHINII Prain. A slender creeper 10-20 feet long with rigid subsulcate grey canescent stem and branches. Leaves 4-6 in. long, 3-foliolate; leaflets subtrapezoid, cuspidate acuminate at apex narrowed from below the middle to a rounded base, the lateral pair

obliquely; blueish-green faintly puberulous above, densely grey-canescent beneath 2-2·5 in. long, 1·75-2 in. wide; petiole 1·5-4 in. long, puberulous; petiolules '15 in. long, puberulous; stipels very minute caducous, stipules lanceolate ·1 in. long caducous. Racemes 2-3 in. long on peduncles 4-6 in. long, overtopping the leaves; pedicels geminate ·2 in. long. Calyx grey-pubescent with reddish streaks, ·3 in. long, tube wide campanulate, lower tooth lanceolate as long as tube and twice as long as lateral deltoid and connate upper pair. Corolla ·5 in. long, externally dark brown, within pale yellow; keel beaked, standard ·6 in. wide, orbicular entire. Pod 2·5 in. long, ·25 in. wide, linear, pedicel abruptly recurved, closely grey-canescent; 6-8 seeded.

Perak; in open grassy or bamboo jungles, at Dijong, Scortechini, 1841! Kunstler, 908! Ulu Bubong, Kunstler, 10852!

A species with somewhat the appearance of Rhynchosia bracteata but with much more slender stems. It also resembles, but to a less degree, Atylosia mollis Its pods, however, have no depressions between the seeds and this renders it necessary to refer the plant to Dunbaria.

### 6. ATYLOSIA W. & A.

Herbs or shrubs, erect or twining. Leaves 3-foliolate, sometimes subdigitate often exstipellate, gland-dotted beneath. Flowers axillary or racemed. Calyx teeth distinct, longer or shorter than the tube the lowest the longest. Corolla more or less exserted, marcescent or caducous; keel not beaked. Stanens diadelphous; anthers uniform. Ovary sessile; ovules 3 or more; style filiform incurved glabrous, stigma capitate. Pod linear or oblong, turgid, marked with horizontal or oblique transverse lines between the seeds which have a conspicuous divided strophiole. Species about 25; from India to Australia and Mauritius.

Petals marcescent, leaflets large pinnately trifoliolate ... 1. A. crassa.

Petals deciduous, leaflets small subdigitate ... 2. A. scarabæoides.

§ ATYLIA. Petals marcescent, remaining till the pod developes.

1. Atylosia crassa Prain. A twining species with firm slender striate shortly-tomentose stems and branches. Leaves 3-6 in. long, pinnately 3-foliolate; leaflets subtrapezoid enspidate-acuminate at apex narrow from beyond the middle to a rounded base, the lateral pair obliquely, dark green and rather densely puberulous especially on the nerves above, densely greenish-brown pubescent and reticulately veined beneath, 2-3 in. long, 1.75-2.25 in. wide; petiole 1.5-2.5 in. long, pubescent; petiolules 15 in. stipels subulate 1 in. long, pubescent; petiolules minute caducous. Racemes 2-3 in. long, lax short-peduncled, pedicels geminate 3-5 in. long; bracteoles large roundish acute reddish 6 in. long, forming a conspicuous tuft before the racemes expand. Calyx 4 in. finely grey-downy lowest tooth lanceolate as long

as the narrowly campanulate tube. Corolla yellow, 75 in. long. Pod 1-1·25 in. long, 6 in. wide, straight, rounded at both ends closely greenish-brown viscidly puberulous, 3-5-seeded, obliquely transversely depressed between the smallish seeds of which the longer diameter is parallel to the direction of the pod. Dolichos reticulatus Ham. in Wall. Cat. 5552 not of Ait. D. crassus Grah. in Wall. Cat. 5553. Dunbaria Horsfieldii Miq. in Flor. Ind. Bat. I, 179. Atylosia mollis Benth. in Pl. Jungh. 243 (excluding syn. Collea mollis Grah.); Bak. in Flor. Brit. Ind. II, 213 (excl. syn. Collea mollis Grah., Atylosia glandulosa Dalz., and Cajanus glandulosus Dalz. & Gibs.)

Andamans; very common. Distrib. India, Indo-China, Malay Archipelago.

The prior name for this species is *Dolichos reticulatus* Ham. but the name Atylosia reticulata may not be employed for it owing to there being another A. reticulata from Australia based on the *Dolichos reticulatus* Ait. of the Hortus Kewensis which was known before our plant. The nearest ally of this species is the purely Himalayan and quite distinct A. mollis Bth. (Collwa mollis Grah.)

§ CANTHAROSPERMUM. Petals falling before the pod developes.

2. ATYLOSIA SCARABEOIDES Benth. Pl. Jungh. 243. A slender biennial herbaceous twiner with densely grey-downy stems and branches. Leaves 1.5-2 in. long, subdigitately 3-foliolate; leaflets obovate-oblong subcoriaceous flexible 1-1.5 in. long, .5-.75 in. wide, obtuse or subacute thinly grey-canescent above, densely pubescent, 3-nerved in lower twothirds and faintly reticulate-veined beneath; petiole 5 in. long, brownish pubescent; stipels 0, stipules minute caducous. Racemes 2-6-fid., on densely pubescent axillary peduncles 3-4 in. long; pedicels 25 in. long also pubescent. Calyx 25 in., densely brownish-grey silky, teeth linear. the lowest twice as long as tube. Corolla '4 in. long, keel abruptly incurved at tip. Pod straight '75-1 in. long, '25 in. wide, clothed with fine spreading brown silky hairs, with slightly oblique transverse depressed lines between the 4-5-seeds. Mig. Flor. Ind. Bat. I, 173; Bak. in Flor. Brit. Ind. II, 215. Dolichos scarabæoides Linn. Sp. Pl. 726. Cajanus scarabæoides Thouars ex Grab. in Wall. Cat. 5580. Rhynchosia scarabæoides DC. Prodr. II, 387. R. biflora DC. Prodr. II. 387. Cantharospermum pauciflorum W. & A. Prodr. 255.

Malacca; Griffith! Distrib. India, Indo-China, Malaya, China, Mascarene Islands.

### 7. CAJANUS DC.

An erect shrub. Leaves 3-foliolate. Flowers racemed. Calya-tube campanulate; teeth short. Corolla much exserted, its petals equal in length; keel truncate. Stamens diadelphous; anthers uniform. Ovary subsessile, few-ovuled; style long, filiform, much upcurved, stigma capi-

tate. Pod linear, straight, narrowed at both ends, 3-5-seeded, torulose with oblique linear depressions between the non-strophiolate seeds.

The only species.

CAJANUS INDICUS Spreng. Syst. III, 248. An erect shrub 6-8 feet high with slender grooved grey-silky branchlets. Leaves 2-5 in. long; petiole 5-1.5 in. finely fluted densely adpressed hoary; leaflets 3 oblonglanceolate entire subcoriaceous, terminal 1.75-3 in. long, .5-1.25 in. wide lateral similar but smaller 1.25-1.75 in. long, 35-75 in. wide, thinly silky above densely shortly silky and indistinctly gland-dotted beneath, nerves 6-9 pairs oblique prominent; stipels minute; stipules lanceolate hoary-canescent externally, 15 in. long. Inflorescence in sparse corymbose axillary racemes with peduncles 2 in. long and in a terminal panicle; pedicels downy the lowest 5 in. long, bracteoles obsolete. Calyx campanulate 25 in. long, teeth triangular shorter than tube. Corolla 6-75 in., standard yellow, or yellow with red veins, or rarely red. Pod 2-3 in. long, 25-45 in. wide, finely downy, with oblique cross depressions between the 2-6 seeds; armed at tip with thickened base and lower half of style; testa firm from pale to dark brown. W. & A. Prodr. 256; Miq. Flor. Ind. Bat. I, 174; Bak. in Flor. Brit. Ind. II, 217. C. flavus DC. Prodr. II, 406. C. bicolor DC. Prodr. II, 406; Wall. Cat. 5577. Cytisus Cajan Linn. Sp. Pl. 739; Roxb. Flor. Ind. III, 325. C. pseudo-Cajan Jacq. Hort. Vindob. t. 119.

ANDAMANS; PERAK; PENANG; MALACCA. DISTRIB. Cultivated everywhere in the tropics; probably a native of S.-E. Asia.

## 8. PHASEOLUS Linn.

Twiners, usually herbaceous, with 3-foliolate stipellate leaves. Flowers in copious axillary racemes; bracteoles usually conspicuous and persistent. Calyx campanulate, the lowest tooth usually longer than the rest and the two uppermost subconnate. Corolla much exserted, the keel prolonged into a very long beak which forms a complete spiral. Stamens diadelphous; anthers uniform. Ovary sessile, many-ovuled; style filiform, twisted round with the keel, conspicuously bearded down the side below the very oblique stigma. Pod linear, rarely oblong, subterete or subcompressed, more or less distinctly septate between the seeds. Species about 60, mostly tropical, many widely cultivated, especially in America.

Stipules small basifixed :-

Petals yellow puberulous externally, pods broad subcom-

pressed ... ... ... ... 1. P. lunatus.
Petals red glabrous, pods narrow subtorulose between seeds 2. P. adenanthus.

Stipules produced below point of insertion (petals yellow, glabrous):—

Pods subcylindric glabrous :-

Stems slender diffuse, racemes subcapitate, leaslets less than half as long as petioles, seeds rounded at ends ... 3. P. trilobus.

Stems twining, racemes subspicate, leaslets as long as petioles, seeds subtruncate ... ... 4. P. calcaratus.

Pods slightly compressed, pubescent; (racemes subcapitate, seeds rounded at ends) ... ... ... ...

seeds rounded at ends) ... ... ... 5. P. Mungo.

§ EUPHASEOLUS. Stipules small, basifixed. Pods broad subcompressed.

1. Phaseolus lunatus Linn. Sp. Pl. 724. A tall twining biennial with stems at first finely downy but soon glabrescent. Leaves 6-8 in. long, leaflets 3, pale-green membranous entire rather wide triangular acute, base wide cuneate-of lateral leaflets obliquely, glabrous above minutely sparsely puberulous beneath, 3-4 in. long, 2-2.5 in. wide; petiole 4-6 in. long, and petiolules 2 in. long puberulous; stipels 15 in. long ovate-acute; stipules hardly larger and similar. Racemes axillary lax 2-6 in. long peduncles short the lower nodes distant; flowers in fascicles of 2-4, pedicels 35 in. long, bracts minute. Calux ·1 in. long minutely 2-bracteolate at the base, puberulous externally teeth wide triangular very short. Corolla greenish-yellow 35 in. long puberulous externally. Pod decidedly compressed 2-3 in. long, 6-75 in. wide, '25 in. thick; upper suture recurved, lower widely rounded. DC. Prodr. II, 393; Roxb. Flor. Ind. III, 287; W. & A. Prodr. 244; Miq. Flor. Ind. Bat. I, 194; Bak. in Flor. Brit. Ind. II, 200. P. vulgaris Wall. Cat. 5595 not of Linn.

In all the provinces, cultivated.

An American species now widely spread in the old world.

- § Leptospron Bth. & Hk. f. Stipules medium, basifixed. Pods narrow subcompressed.
- 2. Phaseolus adenanthus G. W. F. Mey. Prim. Flor. Esseq. 239. A spreading glabrescent perennial, with slender rigid stems. Leaves 4-6 in. long; leaflets 3 medium to pale green, chartaceous, ovate-acute base cuneate—of lateral leaflets obliquely, nerves on both surfaces at first sparsely puberulous, otherwise glabrous, 2·5-4 in. long, 1·25-2 in. wide; petiole 2·5 in. long channelled above very sparsely hirsute or glabrous, petiolules ·2 in. long puberulous; stipels ·1 in. ovate adpressed, stipules often reflexed ovate-acute ·2 in. long. Racemes axillary rather crowded, peduncles 1-4 in. long nodes rather close together; flowers 1-3 from each node, pedicels under ·1 in. long, bracts minute. Calyx ·25 in. long campanulate, teeth deltoid to lanceolate half as long as tube, with 2 ovate bracteoles ·1 in. long at its base. Corolla pink to purple, showy, 1 in.

long glabrous. Pod decidedly compressed 4-6 in. long, 4 in. wide, 2 in. thick upper suture much recurved, subtorulose between the 10-16 brown or red seeds 3 in. long, 25 in. wide, with a small hilum. Bak. in Flor. Brit. Ind. II, 200. P. alatus Roxb. Hort. Beng. 54; Flor. Ind. III, 288 not of Linn. P. amurus Roxb. ex W. & A. Prodr. 244. P. rostratus Wall. Pl. As. Rar. I, 50, t. 63; Cat. 5610; W. & A. Prodr. 244; Wight, Ic. t. 34. P. truxillensis H. B. K. Nov. Gen. & Sp. VI, 451; DC. Prodr. II, 392. P. senegalensis Guill. & Perr. Fl. Seneg. 217.

Andaman, R. Andaman, Helfer! S. Andaman, King's Collector! Narcondam, growing on the boulders of the higher beach, Prain! DISTRIB. Cosmopolitan in the tropics.

A very beautiful species not yet reported from the Malay Peninsula proper and not recorded by Prof. Miquel from the Malay Archipelago. It may, however, be found if looked for in the sea-fences of screw-pines along the coasts, this being the habitat chiefly affected by it in the Andaman group.

§ STROPHOSTYLES Bth. & Hk. f. Stipules produced below their point of insertion.

3. Phaseolus Trilobus Ait. Hort. Kew., ed. I, III, 30. A slender diffuse spreading glabrous or slightly pubescent annual or perennial weed with stems reaching 2-3 feet. Leaves 4 in. long; leaflets 3 pale green membranous, 3-lobed or, especially the terminal, at times entire, less often 3-fid to -partite, small suborbicular '75-1 in. in diam. rarely oblong 1.5 in. long by 1 in. wide; petiole long 2-3 in. usually glabrous, petiolules 2 in.; stipels ovate-acute under 1 in.; stipules 25-5 in. long, ovate-oblong. Racemes axillary subcapitate, at ends of erect stoutish peduncles 6-12 in. long, bracts ovate-acute 15-2 in. long deciduous; pedicels ·1 in. Calyx campanulate ·07-·1 in. yellowishgreen, teeth minute deltoid, bracteoles at base lanceolate longer than calyx. Corolla yellow 2-25 in. long glabrous. Pod cylindric 1-2 in. long, 15 in. in diam. glabrous straight or slightly recurved, 6-12 seeded. Roxb. Hort. Beng. 54; Flor. Ind. III, 298; Wall. Cat. 5588, chiefly; W. & A. Prodr. 246; Wight, Ic. t. 94; Mig. Flor. Ind. Bat. I, 198. Dolichos trilobus Linn. Mantiss. I, 101; Burm. Flor. Ind. 160, t. 50, f. 1; DC. Prodr. II, 399. D. stipulaceus Lamk, Encyc. Meth. II, 300.

Andamans; an introduced weed. Distrib. Northern Africa, S.-E. Asia, Malay Archipelago.

An annual crop and a perennial weed throughout its natural area. The perennial form has usually more deeply lobed leaflets; in the annual form lobed and entire leaflets are generally met with in varying proportions on the same plant. Though not as yet recorded from the Malay Peninsula proper, it may be expected to occur there as an introduced weed.

4. Phaseolus Calcaratus Roxb. Hort. Beng. 54. A twining annual, or perennial with annual pubescent rarely glabrous stems 6-10 feet long,

rarely subcrect with stems 1-2 feet high. Leaves usually 4-5 in. long; leaflets 3 membranous sparsely adpressed-pubescent on both surfaces, ovate to lanceolate, acute or shortly acuminate, entire or faintly repand rarely slightly lobed, base of terminal leaflet cuneate of lateral truncate or subsuriculately lobed to outer side, 2-4 in. long, 1-2.5 in. wide; petioles 2-4 in. long, pubescent with spreading or slightly reversed hairs, petiolules '15 in. long, pubescent, stipels '15 in. long, glabrous lanceolate, stipules 2-25 in. long, lanceolate glabrescent. Racemes subspicate 75-1.5 in. long, at end of stoutish peduncles 5-8 in. long, pubescent with at first decidedly reflexed hairs; flowers 2-3 together from 6-8 nodes at length 2 in. apart, lower pedicels at length 2 in. long, bracts lanceolate 25 in. long fixed above the base. Calyx 15 in. long teeth short deltoid, bracteoles narrowly lanceolate 2 in. long. Corolla yellow ·5-·75 in. long, glabrous. Pod 2·5-3 in. long ·2 in. wide, recurved glabrous; seeds 10-12 subtruncate at ends with prominent hilum half as long as seed.

Var. typica; stems pubescent. Roxb. Flor. Ind. III, 289; Wall. Cat. 5611; W. & A. Prodr. 245; Bak. in Flor. Brit. Ind. II, 203. P. hirtus Wall. Cat. 5593 not of Retz. P. sublobatus Wall. Cat. 5598 not of Roxb. P. pubescens Blume Cat. Bog. 94; Miq. Flor. Ind. Bat. I, 200.

PERAK; Batu Kuran, common, Scortechini! Curtis 2984! Andamans; common, cultivated and as an escape. Distrib. S.-E. Asia and Malaya.

VAR. gracilis; stems slender, glabrous.

PERAK; Larut, Scortechini 1476! Wray 1756! Goping, Kunstler 990! Durian, Kunstler 1035! 2467! Pahang; at Pekan, Ridley 1124! DISTRIB. Sumatra (Forbes).

But for the more slender and glabrous stems there is no character to separate VAR. gracilis from P. calcaratus which is otherwise a sufficiently variable species. Except that it is described as having subtorulose pods even when old, the writer would have no hesitation in referring P. luteus Bl. to VAR. gracilis. As a matter of fact the pods of all the varieties of P. calcaratus are subtorulose when young, and in Roxburgh's P. torosus, which is referable to P. calcaratus, they continue so; but, not having seen specimens, the writer does not feel justified in formally reducing Blume's plant, and would leave the matter to be settled by the botanists of the Dutch Indies.

5. Phaseolus Mungo Linn. Mantiss. I, 101. A spreading annual or perenuial with slender annual pubescent stems 6-10 feet long, growing in open grassy places (Kunstler). Leaves 8-10 in. long; leaflets 3 blueish-green membranous ovate-acute, base wide-truncate—of lateral leaflets oblique, sparsely pubescent on both surfaces, 3-5 in. long, 2·5-4 in. wide, petioles 5 in. long sparsely pubescent with spreading hairs,

petiolules 2 in. long densely pubescent, stipels slender subulate 2 in. long, stipules lanceolate sparsely pubescent 3 in. long. Racemes dense few-fid. at the end of sparsely pubescent peduncles 4 in. long, bracts lanceolate densely pubescent 3 in. long, pedicels 1 in. Calyx 15 in. long puberulous externally, teeth triangular except the lowest lanceolate which is twice as long as the others and half as long as calyx-tube; bracteoles at base as long as bracts but rather narrower. Corolla bright yellow 5 in. long glabrous. Pods ascending or almost erect, densely clothed with spreading hairs, 1.5-2 in. long, 25 in. wide, compressed, 6-8 seeded. Seeds 15 in. long, 1 in. wide, dark brown, flat, oval, hilum one-third as long as seed not very prominent, dissipiment between seeds not pronounced. W. & A. Prodr. 245; Wall. Cat. 5889 in part only. P. radiatus Roxb. Hort. Beng. 54; Flor. Ind. III, 296; Miq. Flor. Ind. Bat. I, 197 in part, not of Linn. P. Mungo var. radiatus Bak. in Flor. Brit. Ind. II, 203.

PROV. Wellesley; at Prye Dock, Curtis 2211! PERAK; at Goping, Kunstler 946! DISTRIB. Wild in S.-E. Asia and also largely cultivated.

Very nearly related to *P. sublobatus* Roxb. (*P. trinervius* Heyne) which differs in having narrower pods, more distinct dissepiments between the much smaller seeds, and a rusty-red pubescence. This is the wild form of the plant cultivated in India as the *másh-kulai* or *urd* crop; though it happens to have been named *P. Mungo* by Linnæus it is quite distinct from the *Múng* plant which has spreading pods with smaller seeds and dark green leaves. The *Múng* is the species named *P. radiatus* by Linnæus.

### 9. VIGNA Savi.

Twining herbs or shrubs with pinnately 3-foliolate stipellate leaves. Flowers in copious axillary racemes bracteoles conspicuous. Calyx campanulate; teeth short or long, the upper often connate. Corolla much exserted; keel truncate or exserted not spirally twisted. Stamens diadelphous, anthers uniform. Ovary sessile many-ovuled; style long filiform, bearded along the inner face below the oblique stigma. Pod linear, subterete, subseptate. Species 40-50, mostly tropical; one widely cultivated.

Keel not prolonged into a beak; pods glabrous:—

Stems trailing, pods short few-seeded; a wild sea-coast species ... ... ... ... ... ... ... 1. V. retusa.

Stems subserect or twining, pods long very many-seeded; a widely cultivated plant ... ... ... ... 2. V. Catjang.

Keel prolonged into a beak; pods pilose ... 3. V. pilosa.

1. Vigna retusa Walp. Rep. I, 778. An extensively spreading perennial trailing sea-coast species with glabrous stems. Leaves 3-4 in. long. leaflets 3, pale green, glabrous ovate to obovate thinly fleshy,

entire; apex obtuse or sometimes retuse base cuneate or rounded, 2 in. long, 1.5 in. wide; petiole 1.5 in., glabrous; petiolules 1.5 in. sparsely hairy, stipels 0.6 in. recurved lanceolate glabrous, stipules 1 in. lanceolate basifixed. Racemes rather densely 12-20-fid. on peduncles 2-6 in. long, nodes 1-2-fid., the lowest 1.5 in. apart; pedicels slender puberulous 2 in. long, bracts 1.5 in. long membranous ovate-lanceolate very early deciduous. Calya campanulate faintly puberulous 12 in. long teeth short deltoid. Corolla yellow, glabrous, 5 in. long. Pod 1.5-2.5 in. long 4 in. wide 2.5 in. thick, glabrous subtorulose, seeds 4-8. V. anomala Walp. Rep. I. 779. V. lutea A. Gray in Bot. Wilkes Exped. I, 452; Bak. in Flor. Brit. Ind. II, 205. Dolichos luteus Sw. in Prodr. Veg. Ind. Occ. 105; DC. Prodr. II. 398. Phaseolus obovatus Grah. in Wall. Cat. 5609.

ANDAMANS and NICOBARS; common on all the coasts from the Coco group and Narcondam south to Katschall and Kamorta. Perak; Scortechini! Ridley 8011! MALACCA; Griffith! A cosmopolitan littoral species.

2. VIGNA CATJANG Walp. in Linnea XIII, 533. A subcrect or twining annual with glabrous stems. Leaves 4-8 in. long; leaflets 3 membranous pale-green ovate-rhomboid entire or slightly lobed, apex acute base shortly wide-cuneate—of lateral leaflets obliquely, glabrous on both surfaces, 2.5 in. long by 1.75 in. wide or rather larger (VAR. typica) to 4 in. long by 3.5 in. or rather less (VAR. sinensis); petiole 1.5-4 in. long glabrous, petiolules 15 in. long glabrous or puberulous; stipels ovate obtuse 1 in., stipules 3-4 in. long attached above the base, membranous persistent ovate-lanceolate. Racemes subcapitately few-fld. on peduncles usually 1-4 in. long (VAR. typica) sometimes 8-12 in. long (VAR. sinensis); pedicels short (under 'l in.), bracts membranous, fixed above base, deciduous. Calyx glabrous 4 in., teeth deltoid-cuspidate one-third as long as tube. Corolla yellow, white, or pinkish .75 in. long. Pod 4-24 in. long, 3-4 in. wide, scarcely depressed between the seeds; seeds 12-30 (in much elongated pods the spaces between the seeds are greatly widened). Bak. in Flor. Brit. Ind. II, 205.

Var. typica; suberect, leaves smaller and pods shorter. V. Catjang Walp.; Endl. ex Miq. Flor. Ind. Bat. I, 188. Dolichos Catjang Linn. Mantiss. 269; DC. Prodr. II, 399; Roxb. Hort. Beng. 55; Flor. Ind. III, 303; Wall. Cat. 5549.

Cultivated in most of the provinces.

Var. sinensis; twining, leaves larger and pods longer. Vigna sinensis Endl. ex Hassk. Pl. Jav. Rar. 386; Savi ex Miq. Flor. Ind. Bat. I, 187. Dolichos sinensis Linn. Cent. Pl. II, 28; Amoen. Acad. IV, 326; DC. Prodr. II, 399; Roxb. Hort. Beng. 55; Flor. Ind. III, 302; 52

Wall. Cat. 5550; Bot. Mag. t. 2232; W. & A. Prodr. 250. D. tranquebaricus Jacq. Hort. Vidob. III, t. 70; DC. Prodr. II, 400.

Cultivated in most of the provinces.

Widely cultivated in the Eastern Hemisphere; probably a native of S.-E. Asia, but apparently not now known in a truly wild state.

3. Vigna pilosa Bak. in Flor. Brit. Ind. II, 207. A slender twining perennial with hirsute stems. Leaves 5-8 in long, leaflets 3, green, downy to subscabrid on both surfaces, entire ovate-acute 3-6 in. long, 1·5-2·5 in. wide, base truncate—of lateral leaflets unequally; petiole 2 in. long, closely downy, petiolules 05 in. only, stipe is subulate minute; stipules 1 in. lanceolate caducous. Racenes many-fld. 2-3 in. long on peduncles 5-2 in. long, nodes 1-2-fld. all close together in flower, at length 15 in. apart, pedicels 1 in. downy, bracts minute. Calyx campanulate oblique thinly silky, 3 in. long, lower tooth lanceolate as long as tube one half exceeding the others. Corolla purple 75 in. long. Pod 4-5 in. long, subcylindric 25 in. in diam., densely hirsute with spreading hairs, septate within between the 8-12 subreniform shining black seeds with truncated ends, 25 in. long 15 in. wide. Dolichos pilosus Roxb. Hort. Beng. 55; Flor. Ind. III, 312; DC. Prodr. II, 397: W. & A. Prodr. 249. Phaseolus difformis Wall. Cat. 5599.

Andamans; common, King's Collectors! DISTRIB. India and Indo-China.

# 10. PACHYRHIZUS Rich.

Wide-climbing herbs. Leaves pinnately 3-foliolate with stipellate lobed leaflets. Racemes long, with tumid nodes and fascicled pedicels; bracts and bracteoles setaceous, caducous. Calyx 2-lipped, the limb as long as the tube, the upper lip emarginate, the lower deeply 3-toothed. Corolla much exserted, the petals subequal; keel obtuse. Stamens diadelphous; anthers uniform. Ovary subsessile, many-ovuled; style long circinate at the apex, bearded down the inner side below the very oblique stigma. Pod large, linear, turgid, deeply depressed between the seeds. Species 2 or 3; the others Mexican and Angolan.

The oldest name for this genus is *Cacara* under which designation it was published by Thouars (*Dict. Sc. Nat.* V, 35) twenty years before Richard's name was issued.

PACHYRHIZUS ANGULATUS Rich. ex DC. Prodr. II, 402. A large strong climber with a tuberous root; stems stout, suffruticose, young stems and branches deciduously downy. Leaves 8-9 in. long, trifoliolate; leaflets large, membranous glabrous as broad as long base entire deltoid from middle of circumference anterior half deeply or shallowly lobed, 4 in. long, as much across; petiole 5-6 in. long glabrous, petiolules ·2 in.

long pubescent; stipels 'l in. subulate, stipules lanceolate puberulous '2 in. long. Racemes lax elongated 6-10 in. long on axillary peduncles 12 in. long and upwards, nodes 2-6-fld., lower sometimes 1 in. apart often produced into branches '5 in. long; bracts lanceolate '25 in. long silky. Calyx campanulate, teeth triangular nearly equalling tube, '25 in. long, pedicels '3 in. long, bracteoles setaceous silky shorter than calyx. Corolla purple 1 in. long. Pod at first adpressed-pubescent, at length almost glabrous 6-9 in. long '5 in. wide, '2 in. thick, deeply depressed along the valves between the 7-12 shining cinnamon-brown flattened seeds '3 in. long, '25 in. wide. Wall. Cat. 5526; W. & A. Prodr. 251; Miq. Flor. Ind. Bat. I, 191; Bak. in Flor. Brit. Ind. II, 207. P. trilobus DC. Prodr. II, 402. Dolichos erosus Linn. Sp. Pl. 726. D. bulbosus Linn. Sp. Pl., Ed. II, 1020; Roxb. Flor. Ind. III, 309. D. trilobus Lour. Flor. Cochinch. II, 535. Cacara erosa Kuntze Rev. Gen. Pl. I, 165.

Cultivated in most of the provinces. DISTRIB. Cosmopolitan in the tropics, probably originally American.

This is known, Mr. Curtis notes, as Obic Songnang in the Island of Penang. The large tuberous root, white outside and inside of the appearance and consistence of a turnip, is occasionally, according to Dr. Watt's Dictionary of Economic Products, 6-8 feet long and as thick as a man's thigh. It is eaten both cooked and uncooked, is palatable enough but rather insipid. If the rules as to priority of names be rigidly applied this must be known as Cacara erosa Kuntze.

### 11. Dolichos Linn.

Twining herbs with stipellate 3-foliolate leaves and minute subpersistent bracts bracteoles and stipules. Flowers racemose or axillary. Calyx-tube campanulate, teeth long or short. Corolla much exserted; its petals usually equal in length; keel obtuse or rostrate not spiral. Stamens diadelphous; anthers uniform. Ovary nearly sessile, manyovuled; style thickened upwards and bearded down the inner edge or filiform and penicillate round the terminal stigma. Pod flat, linear or oblong, recurved. Species about 20, wide-spread in the tropics of both hemispheres.

The only species so far reported from the Malay Peninsula belongs to the group LABLAB, with a style thickened upwards from a narrow base, bearded down the inner edge. This group is treated by Baker as a subgenus, by Taubert as a section, of Dolichos. De Candolle, Wight & Arnott, and Kurz consider however, with Savi, that it would be preferable to deal with this as the type of a distinct genus Lablab.

Dolichos Lablas Linn. Sp. Pl. 725. A tall subglabrous wide twining perennial or annual with round smooth or slightly downy stems. Leaves 4-12 in. long, 3-foliolate; leaflets entire ovate-acute, base cuneate or deltoid, rather pale green, glabrous or slightly pubescent beneath.

2-6 in. long and almost as broad; petiole 2-8 in. long, glabrous; petiolules ·2 in. long puberulous; stipels ·15 in. long subulate smooth; stipules lanceolate ·2 in. long basifixed. Racemes lax 6-9 in. long on peduncles 5-8 in. long; pedicels fascicled ·15-·25 in. long on nodes ·5-·75 in. apart; bracts early deciduous. Calyx ·2 in., teeth short deltoid, bracteoles oblong ·15-·2 in. Corolla white or pink ·6 in. long. Pod 1·5-2 in. long (in one rather unusual form 3 in. long) tipped with the hooked persistent base of the style. Bak. in Flor. Brit, Ind. II, 209.

Var. typica; pods longer, seeds with long axis along the pod. D. Lablab Linn. Sp. Pl. 725. D. lignosus Roxb. Flor. Ind. III, 305 not of Linn. Lablab vulgaris Savi, Diss. 19; DC. Prodr. II, 401; W. & A. Prodr. 250; Miq. Flor. Ind. Bat. I, 189. D. cultratus Forsk. Flor. Ægypt. Arab. 134.

PERAK; cultivated, Scortechini! Andamans; cultivated, common. Cultivated everywhere in the tropics of the Old World.

Var. lignosa; pods shorter broader at the end, seeds with long axis across the pod. D. lignosus Linn. Sp. Pl. 726. D. Lablab Roxb. Flor. Ind. III, 307 not of Linn. D. cultratus Thunb. Trans. Linn. Soc. II, 320 not of Forsk. Lablab cultratus DC. Prodr. II, 402; W. & A. Prodr. 251; Miq. Flor. Ind. Bat. I, 190. L. microcarpus DC. Prodr. II, 402; Miq. Flor. Ind. Bat. I, 190.

ANDAMANS; cultivated. Cultivated throughout south-eastern Asia.

In deference to the great authority of Mr. Baker these two very distinct plants are united specifically; they are however so different that they must be treated as at least separate varieties.

# 12. PSOPHOCARPUS Neck.

Twining herbs, with large tuberous roots. Leaves 3-foliolate, stipellate; stipules fastened above the base. Flowers rather large, lilac. Calyx teeth shorter than the tube, the two upper connate. Corolla much exserted, the petals equal in length; keel much incurved, but not beaked. Stamens monadelphous, the upper free downwards; anthers uniform. Ovary substipitate, many-ovuled; style long, much recurved, flattened laterally, densely bearded round the terminal stigma. Pod square, with a distinct wing to each angle, distinctly septate between the seeds. Species 3-4, all tropical in the Old World.

PSOPHOGARPUS TETRAGONOLOBUS DC. Prodr. II, 403. A slender annual glabrous twiner with tuberous roots. Leaves 5-10 in. long; leaflets 3 ovate, acute or acuminate, base rounded or wide-cuneate, margin entire or slightly waved, glabrous, green above, paler sometimes slightly glaucescent beneath, 3-6 in. long, 2-6 in. wide; petiole 2-4 in.

glabrous, petiolules '15 in. sparsely hairy along the sides; stipels lanceolate, glabrous 'l in. long, stipules oblanceolate acute towards both ends from the almost median insertion, 3 in long, glabrous. Racemes lax 4-6 fld.; peduncles 2-6 in. long; pedicels geminate 5 in. long, bracts small ovate, '08 in long. Calyx campanulate glabrous oblique; upper connate teeth rounded emarginate, lateral oblong rather exceeding lowest; bracteoles 2 ovate, striate, glabrous, attached slightly above the base 15 in. long twice as large as bracts, half as long as buds. Corolla blue or white 1.5 in. long. Pod 6-12 in. long, 1.35 in. wide, the wings along the angles membranous 5 in. wide their margins crisped dentate and laciniate; seeds 8-16, rounded. W. & A. Prodr. 252; Hassk. Pl. Jav. Rar. 388 (VAR. a. only); Miq. Flor. Ind. Bat. I, 181 (VAR. a. only). Dolichos telragonolobus Linn. Syst., Ed. X, 1162; Roxb. Flor. Ind. III, 305 (in part). D. ovatus Grah. in Wall. Cat. 5540.—Rumph. Herb. Amb. V. t. 133.

SINGAPORE; Hullett n. 75!

Cultivated throughout Southern Indo-China and Malaya.

#### 13. CLITORIA Linn.

Scandent or suberect undershrubs, with showy flowers, 3-7-foliolate leaves, stipellate leaflets and persistent membranous small stipules and bracts and large bracteoles. Calyx membranous, tubular; teeth deltoid or lanceolate. Corolla much exserted; standard spoon-shaped, very large; wings and incurved keel much shorter. Stamens monadelphous or diadelphous; anthers uniform. Ovary stalked, many-ovuled; style incurved, flattened, bearded along the inner side. Pod linear, flattish or turgid. Species 27, in tropics of old and new world, mostly the latter.

Pod flattish, valves not keeled on the face (Subgen. Ternatea); stems scandent .. 1. C. Ternatea. Pod turgid, with a rib along face of valves (SUBGEN. Neurocarpum); stems suberect ••• ... 2. C. cajanifolia.

1. CLITORIA TERNATEA Linn. Sp. Pl. 753. A climber with slender terete downy stems. Leaves 4 in. long, petiole '75 in., rachis glabrous; leaflets terminal and in 2-3 opposite pairs ovate or oblong obtuse subcoriaceous; 1-2 in. long 75-1 in. wide, stipules small 2 in. long lanceolate, stipels minute linear. Flowers axillary solitary pedicels ·35-·5 in., bracteoles large roundish obtuse 25-·5 in. long. Calyx ·5-·75 in.; teeth lanceolate nearly as long as tube. Corolla 1.5-2 in. long; standard 1 in. broad, bright blue with an orange centre or (in a commonly cultivated form) white. Pod flattish, valves smooth, 2-4 in. long, 35 in. wide, sparsely hirsute; 6-10-seeded. DC. Prodr. II, 233; Bot. Mag. t. 1542; Roxb. Flor. Ind. III, 321; Wall. Cat. 5344; Miq. Flor. Ind. Bat. 1, 226; Bak. in Flor. Brit. Ind. II, 208.

Andamans; commonly cultivated. Pangkore; Scortechini! Dis-TRIB.; common throughout the tropics in gardens and as an escape.

2. CLITORIA CAJANIFOLIA Benth. in Mart. Flor. Brasil. XV, 121. A suberect undershrub with terete pilose branches. Leaves 2-3·5 in. long; petiole 1 in. and rachis adpressed-pilose; leaflets terminal and in 1 lateral pair lanceolate or oblanceolate obtuse subcoriaceous 2-5 in. long, 75·1 in. wide, glabrous above, densely grey-canescent beneath; stipules shortly triangular, pubescent, stipels subulate. Flowers axillary usually 2 on a pubescent peduncle 1-1·5 in. long; bracteoles small ovate or lanceolate. Calyx '75 in. long, teeth much shorter than tube. Corolla 1·5-2 in. long; standard 1·5 in. wide pale-violet with a dull-purple centre. Pod turgid, with a rib along face of valves, 1·25 in. long, '35 in. wide quite glabrous, 5-7 seeded. Bak. in Flor. Brit. Ind. II, 209. Neurocarpum cajanifolium Presl. Symb. 17, t. 9; Miq. Flor. Ind. Bat. I, 225. N. retusum Hassk. Pl. Jav. Rar. 376. Lotus fluminensis Vell. Flor. Flum. VII, t. 152.

MALACCA and SINGAPORE, in old clearings, common. DISTRIB. A native of Brazil now naturalised in the localities mentioned, in Java, and in Siam.

### 14. CENTROSEMA Benth.

Twining herbs or shrubs; stems with woody base. Leaves pinnately 3-foliolate, stipellate; stipules persistent basifixed. Flowers very large and showy with persistent bracts and large persistent bracteoles. Calyx-teeth short the upper pair connate or obsolete. Corolla much exserted; standard orbicular emarginate shortly spurred near base, longer than the falcate obovate wings and the broad incurved slightly shorter keel. Stamens usually diadelphous; anthers uniform. Ovary subsessile, many-ovuled, style incurved dilated at the apex, stigma terminal beardless. Pod subsessile linear flattened, 2-valved, slightly septate between the seeds, both sutures thickened and both valves strongly ridged along the face parallel to the sutures. Species about 25, all American.

Dr. Kuntze states (Rev. Gen. Pl. I, 163) that Bradburya Raf., reduced in the Index Kewensis to Wistaria, is in reality this genus, and that Rafinesque's description refers to Centrosema virginianum a species widely cultivated in Asia and now quite naturalized in Java though not yet reported as an escape in our area.

CENTROSEMA PLUMIERI Benth. in Ann. Wien. Mus. II, 118. A large climber with woody base and twining slender firm glabrous or puberulous branches. Leaves 6-10 in. long; leaflets 3 papery dark green glabrous above puberulous on the nerves beneath broadly ovate acute or acuminate 3-6 in. long, 2·5-5 in. across; petioles 3-6 in., glabrous or puberu-

lous; petiolules 15 in. pubescent; stipels 25 in. long, lanceolate; stipules ovate-oblong persistent subscarious '4 in. Racemes 2-6-fld., peduncles thick 1-2 in. long, pedicels usually geminate 1-15 in. long, bracts pubescent orbicular-cucullate as long as pedicels. Calyx 25 in. long, oblique wide-campanulate glabrescent, upper tooth very short, lateral wide blunt, lower longer lanceolate, completely hidden by the large persistent coriaceous striate ovate obtuse bracts 6-75 in. long. Corolla large, standard 1.75 in. long, 1.5 in. wide, white, or white with crimson centre, pubescent externally; wings white tipped with violet or rose 1 in. long, '5 in. wide; keel sometimes white, sometimes crimson. Pod 6 in. long, 5 in. wide, straight, beaked by the persistent style 1 in. long, both sutures thickened, the lower with narrow longitudinal wings 'I in, remote from the suture; seeds 10-12 oblong or subglobose, hilum oblong-linear. Mart. Flor. Bras. XV, I, 127. Clitoria Plumieri Juss. in Pers. Synops. II, 303; Edwards, Bot. Reg. IV, 268. C. fluminensis Vell. Flor. Flum. VII, 312, t. 128. Cruminium giganteum Desv. Ann. Sc. Nat. Ser. I, IX, 423.

Perak; at Kampar, Curtis 3140! Singapore; Hullett 57! 669! no doubt an escape from gardens, as it also is in Sumatra where it has been found growing in forests near Lampar (Forbes n. 2599!) A native of South America; cultivated in Asiatic gardens on account of its handsome flowers.

### 15. TERAMNUS SW.

Twining herbs, of slender habit. Calyx-tube campanulate; teeth distinct, subequal or two upper not so long. Corolla little exserted; petals about equal in length; standard not spurred. Stamens monadelphous; alternate anthers small, abortive. Ovary sessile, many-ovuled; style short, curved, beardless, stigma capitate. Pod linear, hooked with the persistent style at the tip, flattish, septate between the seeds. Species 4, belting the world in the tropics.

Teramnus labialis Spreng. Syst. III, 235. A wide-spreading climber of slender habit with a few adpressed hairs on the stem. Leaves 2·5-4·5 in. long, petiole 1-1·5 in. sparsely adpressed-hirsute; leaflets 3 membranous or subcoriaceous ovate-oblong base rounded apex subacute or at times, especially of lateral pair, obtuse, terminal 1-2·5 in. long ·75-1·5 in. wide, lateral slightly smaller, green glabrescent above sparsely adpressed-hirsute beneath; stipules minute lanceolate deciduous ·15 in. long, stipels subulate ·1 in. Inforescence of elongated lax axillary 8-12-fid. racemes 2-3 in. long; pedicels ·2 in. solitary below fascicled upwards, bracts narrowly lanceolate ·1 in. long, bracteoles close under calyx minute subulate. Calyx ·15-2 in. long, 2-labiate, teeth subequal

lanceolate about as long as the narrowly campanulate tube. Corolla 25 in long reddish, standard emarginate, wings overarching the slightly shorter keel. Pod glabrous recurved linear 1.5-2 in long, 2 in broad, 8-12 seeded. Benth. in Journ. Linn. Soc. VIII, 265; Bak. in Flor. Brit. Ind. II, 184. Glycine labialis Linn. fil. Suppl. 325; Roxb. Flor. Ind. III, 318; W. & A. Prodr. 208; Wight, Ic. t. 168; Miq. Flor. Ind. Bat. I, 222. G. parviflora DC. Prodr. II, 242; Wall. Cat. 5508 (excl. G., H.) G. debilis DC. Prodr. II, 242. G. pallens Grah. in Wall. Cat. 5518.

PENANG; Wallich 5518! DISTRIB. Throughout the tropics.

Var. mollis Baker (Teramnus mollis Benth), should be looked for in the Malay Peninsula, for though it has not yet been reported from our area it occurs in Burnea where it has been collected by Wallich and by Kurz, and again in Java where it appears to be commoner than T. labialis proper. It is distinguished from T. labialis by the presence of spreading hairs on the stem and by the pods being strigosely hirsute with long spreading hairs. Its leaflets also are densely pubescent beneath and its calyx-teeth are shorter than the tube.

### 16. DIOCLEA H. B. K.

Climbing shrubs. Leaves pinnately 3-foliolate, stipellate. Flowers blue or white, in elongated racemes with thickened nodes; bracts and bracteoles caducous. Calyx-tube campanulate, teeth shorter than tube, two upper quite connate. Corolla exserted; petals about equal in length; keel incurved but not beaked. Stamens monadelphous; the vexillary stamen free below connate with the others in the middle shorter than the rest and with a perfect anther; anthers of keel stamens (in Malay species) alternately perfect and abortive. Ovary subsessile hirsute, few-ovuled, style incurved beardless, stigma capitate. Pod oblong turgid 1-3-seeded, flattened along the upper suture. Species 17-18, one Indo-Malayan, one extending to Africa and America, the rest tropical American.

Leaflets glubrescent beneath, larger; flowers 75 in. long; calyx teeth half as long as tube ... ... ... ... 1. D. reflexa.

Leaflets densely velvety beneath; flowers 1 in. long; calyx teeth wider one-third the length of tube ... ... 2. D. javanica.

1. Dioclea Reflexa Hook. f. Niger Flora 306. A strong woody climber 20-30 feet long with rounded black early glabrescent branches. Leaves 3-foliolate 9 in. long; leaflets 3, dull green above paler beneath, subcoriaceous when young sparsely hairy on both surfaces but early becoming glabrous above and glabrous except for a few adpressed hairs on the nerves beneath, ovate shortly acuminate with subtruncate base 5 in. long 3 in across, petiole 4 in. long channelled above sparingly adpressed hirsute; petiolules 25 in rusty pubescent, stipels 2 in. long, subulate,

stipules lanceolate '25 in long, deciduous. Inflorescence in dense subspicate racemes 6 in long on axillary peduncles 8-12 in long with 2-3 widely separated empty bracts; rachis rusty-tomentose, flowers 2-3 together on rounded alternate nodes '2-'25 in apart; bracts '5 in long linear reflexed rusty-pubescent early deciduous. Calyx campanulate '4 in long with two small obtuse bracteoles at base; pedicels '15 in long rusty-puberulous; calyx teeth subequal except the broader truncate upper triangular, half as long as tube. Corolla pale-pink '75 in long, standard-limb orbicular emarginate. Pods few, 1-2-seeded; 3-4 in long, 2 in wide, '5 in thick along upper suture, at first sparsely adpressed rusty-silky at length glabrescent; seeds discoid dark brown 1'25 in in diam. Bak. in Flor. Brit. Ind. II, 196. Dolichos hexandra Roxb. Hort. Beng. 55. D. coriaceus Grah. in Wall. Cat. 5562.

ANDAMANS; very common, Helfer 1752! King's Collectors! Penang or Singapore; Wallich! Perak; Larut, Kunstler 5718! DISTRIB. Silhet; trop. Africa; trop. America.

The vexillary stamen in this and the next species is free at the base though not above; it is rather shorter than the others and bears a perfect anther; the anthers of the 9 stamens that constitute the keel-sheath are alternately perfect and abortive thus giving 5 perfect anthers on the sheath and a sixth perfect anther on the vexillary stamen; hence Roxburgh's excellent specific name.

Dr. Wallich did not obtain this species at Penang and Singapore; his note on the sheet of Cat. n. 5562 at Calcutta states that he had forgotten the precise locality but was of opinion that he obtained the specimen either at Penang or at Singapore.

2. DIOCLEA JAVANICA Benth. Pl. Jungh. 236. A rather slender woody climber 20-30 feet long with rounded black early glabrescent branches. Leaves 3-foliolate 6-7 in. long; leaflets dull green above, coriaceous, beneath densely rusty-velvety, ovate shortly acuminate with subtruncate base 4 in. long 2.25 in. across, petiole 2-3 in. long channelled above, rusty-velvety; petiolules 25 in., velvety, stipels 2 in. long subulate; stipules lanceolate 25 in. long, deciduous. Inflorescence in dense subspicate racemes 6 in. long on axillary peduncles 8-12 in. long with 2-3 widely scattered empty bracts; rachis densely velvety, flowers 2-3 together on rounded alternate nodes 2-25 in. apart; bracts 5 in. long linear reflexed rusty-pubescent early deciduous. Calyx campanulate 5 in. long with two small obtuse bracteoles at base; pedicels 15 in. long rusty-puberulous; calyx teeth subequal except the broader truncate upper wide triangular, one-third as long as tube. Corolla pale-pink 1 in. long, standard-limb orbicular. Pods few usually 1-2sometimes 3-seeded; 3-55 in. long, 2 in. wide, 5 in. thick along upper suture; at first densely rusty-tomentose at length glabrescent; seeds discoid 1.25 in. in diam. Miq. Flor. Ind. Bat. I, 217. D. Fergusonii Thwaites Enum. 412.

PERAK; Larut, Kunstler 5196! 10320! Wray 2000! MALACCA; Maingay 520! DISTRIB. Ceylon; Chittagong; Java.

Very nearly related to the preceding and perhaps only a form of that species. At the same time the characters by which they are separable are very constant in all the specimens of both that the writer has seen, and from the field-botanist's point of view, at least, it is just as well to follow Mr. Bentham in separating them.

### 17. PUERARIA DC.

Twining shrubs or herbs with stipellate pinnately 3-foliolate leaves; leaflets sometimes palmately lobed. Flowers sometimes appearing before leaves, large or small, densely fascicled, in long often compound racemes. Calyx teeth long or short the two upper connate. Corolla distinctly exserted; standard usually spurred at the base equalling in length the obtuse wings and keel. Stamens more or less thoroughly monadelphous; anthers uniform. Ovary sessile or nearly so, many-ovuled; style filiform much incurved beardless, stigma capitate. Pod linear, flattish. Species about 12, mostly Indo-Chinese.

1. PUERARIA PHASEOLOIDES Benth. in Journ. Linn. Soc. IX, 125. A slender creeper 20-30 feet long with adpressed-pubescent slender hardly woody stems, and slender twining branches clothed with spreading greyish-brown hairs. Leaves contemporaneous with flowers, 6-8 in. long; leaflets 3, membranous dull-green thinly adpressed-hirsute above. dark greenish-grey and densely velvety-tomentose beneath, triangular ovate base wide cuneate-of lateral pair obliquely, apex subobtuse margin entire repand or slightly 3-lobed, sub-3-nerved at base, 3-4 in. long. 2-3 in. wide, petiole 3-4 in., densely clothed with spreading hairs, petiolules 2 in. long; stipels small subulate weak 1 in. long, stipules small lanceolate basifixed. Inflorescence of long-peduncled axillary racemes of fascicled flowers; peduncle 6-8 in. and rachis puberulous; racemes 4 in. long, fascicles 25-5 in. apart 4-5-fld., pedicels 2 in. puberulous, bracts and bracteoles lanceolate rather rigid clothed with adpressed bristly hairs, the bracteoles subpersistent. Calyx campanulate 25 in. long clothed with adpressed bristly hairs, teeth unequal upper broad, and lower lanceolate as long as tube and one-third larger than lateral triangular, all setaceous at tip. Corolla pale-blue and white, ·6 in. long, standard-limb suborbicular distinctly spurred. 'Pods numerous, at first puberulous, at length glabrescent slightly recurved at the tip, 3.5 in. long only 2 in. wide. Seeds about 16, 15 in. long 1 in. wide, truncate at ends, dark brown, testa dull minutely rugulose. Bak, in Flor. Brit. Ind. II, 199 (excl. syn. P. subspicata Bth.). Dolichos phaseoloides Roxb. Flor. Ind. III, 316. D. viridis Ham. in Wall. Cat. 5559. Neustanthus phaseoloides Benth. Pl. Jungh. 235; Miq. Flor. Ind. Bat. I, 219. Phaseolus decurvus Grah. in Wall. Cat. 5612.

Andamans; at Port Blair, Prain! Penang; Wallich 5612! Perak; Goping, Kunstler 1062! 2456! 5117! Scortechini 591! 1441! Ipoh, Curtis 3151! DISTRIB. S.-E. Asia.

### 18. CANAVALIA DC.

Large twining perennials or biennials with stipellate pinnately 3-foliolate leaves and showy flowers. Calya deeply tubular, limb 2-labiate, the upper lip projecting, entire or emarginate the lower shortly 3-toothed. Carolla far exserted; standard large roundish; wings shorter equalling the incurved obtuse keel. Stamens monadelphous; anthers uniform. Ovary obscurely stalked many-ovuled; style incurved beardless, stigma terminal. Pod large linear or oblong, flat or turgid with a longitudinal ridge along each margin of the flattened upper suture. Species 10-12, mostly American.

Pods not turgid, deeply double-channelled along the dorsal suture:--

Pods 1:5-2 in. across; flowers many ... 1. C. ensiformis.
Pods 5-75 in. across; flowers few ... 2. C. lineata.
Pods targid, almost flat along the dorsal suture; endocarp
separating ... ... ... 3. C. obtusifolia.

CANAVALIA ENSIFORMIS DC. Prodr. II, 404. A large biennial or perennial climber with glabrous stems and branches. Leaves 3-foliolate 10-12 in. long; leaflets green paler beneath, membranous, when young nuberulous, very soon quite glabrous ovate-acute, base rounded-in lateral pair slightly obliquely; 5-6 in. long, 2.5-4 in. wide; petiole 6 in. long glabrous, petiolules 25 in.; stipels 15 in. subulate very early deciduous; stipules small triangular 1 in. long, caducous. Inflorescence in lax 12-20-fld. racemes 3-8 in. long on axillary peduncles 4-6 in. long; flowers solitary or geminate from swollen nodes 3-5 in. apart, pedicels 1-15 in., bracteoles minute ovate caducous. Calyx campanulate, sparsely puberulous reticulate-veined 6 in, long, upper lip oblong emarginate one-third the length of tube. Corolla lilac or white 1.5 in. long, limb of standard orbicular emarginate. Pods few, long. linear-oblong, slightly curved, dorsal suture strongly 3-keeled and deeply 2-grooved between the keels, 5-20-seeded, in length varying from 6-24 inches, in depth from 1.5-2 in., distance between outer ridges of dorsal suture '5 in. Seeds white, grey or more usually red, 1.25 in. long, 75 in. wide. Bak. in Flor. Brit. Ind. II, 195. C. gladiata DC. Prodr. II, 404; Wall. Cat. 5531; W. & A. Prodr. 253; Mig. Flor. Ind. Bat. I, 216. Dolichos ensiformis Linn. Sp. Pl. 725. D. gladiatus Jaca. Coll. II, 276; Roxb. Hort. Beng. III, 300.

In some of the provinces, cultivated; as it almost universally is throughout the tropics.

The writer follows Mr. Baker in identifying the American Dolichos gladiatus (Canavalia gladiata DC.) with the Asiatic Dolichos ensiformis (Canavalia ensiformis DC.)

2. Canavalia lineata DC. Prodr. II, 404. A glabrous perennial on rocky or sandy sea-coasts. Leaves 3-foliolate 8-9 in. long; leaflets pale-green thickly membranous ovate or orbicular, obtuse with or without a short point, or retuse, base cuneate, 2-3 in. long and 2-3 in. across; petiole 3-5 in. long somewhat fleshy, glabrous; petiolules .25 in., stipels 15 in. subulate very early deciduous; stipules small triangular 1 in. long caducous. Inflorescence in long-peduncled 4-8-fld. racemes on peduncles 10-16 in. long; flowers solitary or geminate from swollen nodes 3-5 in. apart, pedicels 1-15 in. bracteoles minute ovate caducous. Culyx campanulate sparsely puberulous reticulate-veined 6 in. long, upper lip oblong subentire one-fourth the length of tube. Corolla violet 1 in. long, limb of standard orbicular emarginate. Pods few, short, linear-oblong, straight, dorsal suture strongly 3-keeled and deeply 2-grooved between the keels, 4-6-seeded, 3-5 in. long, 75 in. deep; width between outer ridges of dorsal suture 3 in. Seeds dark-brown 5 in. long. Somoko-Dusets XIII, t. 20. Dolichos lineatus Thunbg. Flor. Japon. 280. D. obcordatus Roxb. Flor. Ind. III, 303. Canavalia obtusifolia Bak. in Flor. Brit. Ind. II, 196, not of DC; Cleghorn, Madr. Journ. (n. s.) I, t. 4.

Pahang; Sungei Kelang, Rilley! Penang; common on sand-banks along the coast, Curtis 1714! SINGAPORE; Hullett 514! DISTRIB. Coasts of India, Indo-China, Malaya, China, Japan, Polynesia, Australia.

3. CANAVALIA OBTUSIFOLIA DC. Prodr. II, 404. A large biennial climber with glabrous stems and branches. Leaves 3-foliolate 10-12 in. long; leaflets green, membranous, when young puberulous very soon quite glabrous, ovate-acute to rounded with a shortly acuminate tip, base rounded to subtruncate; 5-6 in. long 3.5-4.5 in. wide; petiole 6 in. long, glabrous; petiolules 25 in.; stipels 15 in. subulate, very early deciduous; stipules small triangular 1 in. long, caducous. Inflorescence in lax 12-16-fid. racemes 3-8 in. long, on axillary peduncles 6-12 in. long; flowers solitary or geminate from swollen nodes 3-5 in. apart, pedicels 1-15. in., bracteoles minute ovate caducous. Calyx campanulate, sparsely puberulous, faintly ridged and not very distinctly reticulate-veined, 5 in long, upper lip rounded hardly emarginate, scarcely longer than lower and not one-sixth the length of tube. Corolla blue and white, 1 in long, limb of standard orbicular slightly emarginate. Pods few, short, turgid, slightly curved, dorsal suture faintly 3-keeled, spaces between keels wide and plane, not grooved, 3-6-seeded, length 3-5 in., depth 1.75-2.25 in., width of dorsal suture between outer keels ·75 in. Seeds pale umber with gamboge streaks, ·75 in. long ·5 in. broad,

embedded in the woolly separable endocarp. Mig. Flor. Ind. Bat. I. 215. C. turgida Grah. in Wall. Cat. n. 5534 A; Mig. in Flor. Ind. Bat. I. 215. C. ensiformis VAR. turgida Bak. in Flor. Brit. Ind. II, 196. Dolichos obtusifolius Lamk. Encyc. Meth. II, 295. D. rotundifolius Vahl. Symb. II, 81; Roxb. Flor. Ind. III, 302.—Rheede Hort. Malab. VIII. t. 43; Pluken. Almag. t. 51, f. 2.

Andamans; Coco Group and Narcondam, Prain! Mid. Andaman, Kurz! S. Andaman, Kurz! Man! King's Collector! Little Andaman. Prain! PERAK: Scortechini 1391! Kunstler 1123! PANGKORE: Scortechini 978! Penang; Wallich 5534! Singapore; Pulo Obin, Hullett 330! DISTRIB. Indian, Indo-Chinese and Malayan coasts.

There is no doubt that, in the first place, this is C. obtusifolia DC.; that, in the second place, it is not C. obtusifolia Bak., in Flor. Brit. Ind.; and that, finally, it is specifically distinct from C. ensiformis of which the Flora makes it a variety. It is however, particularly unfortunate that, while the leaflets of C. lineata are almost always "obtuse," those of C. obtusifolia rarely are.

#### 19. MUCUNA Adans.

Perennials and annuals of wide-twining habit. Leaves ample, stipellate, always 3-foliolate. Flowers large, showy, usually dark purple. turning quite black when dried. Calyx-tube campanulate; two upper teeth quite connate; lowest longer than the middle ones. Corolla much exserted; standard not more than half as long as the rostrate keel. which usually a little exceeds the wings. Stamens diadelphous; anthers dimorphous, like those of the Genistee. Ovary sessile, many-ovuled; style incurved, beardless, stigma capitate. Pod very variable in shape and sculpture, usually covered with brittle needle-like irritating bristles. Species about 30, spread everywhere in the tropics.

Perennials; pods flat, seeds large flattened, with a hilum extending round the greater part of their periphery (Subgen. Zoophthalmum) :-

Pods with plaits across their faces (§ Citta) :-

Racemes long lax simple, bracts large boat-shaped; pods with broad wings, over which the plaits do not extend, down the sutures Racemes short corymbose, bracts small; pods with

transverse plaits that extend across the usually nar-

rower sutural wings :-

Peduncles naked at base; bracteoles longer than buds; calyx-teeth long; podsone-seeded; margins of transverse plaits simple, and of sutural wings entire 2. M. monosperma. Peduncles bracteate at base; bracteoles shorter than buds; calyx-teeth very short; pods two-seeded; margins of plaits 2-plicate, and of sutural wings incised

1. M. imbricata.

... 3. M. biplicata.

Pods without plaits across their faces (§ Carpopogon); (wide-winged down both sutures):—

Racemes short corymbose, bracts large boat-shaped ... 4. M. acuminata.

Racemes long-peduncled, umbelliform, bracts minute... 5. M. gigantea.

Annuals; pods turgid, hooked; seeds small oval with small

lateral hilum (Subgen. STIZOLOBIUM) ... 6. M. pruriens.

Subgen. 1. Zoophthalmum. Perenuial climbers; seeds large more or less flattened, with a long hilum extending round the greater part of the periphery.

§ CITTA. Pods plaited across their faces.

1. Mucuna imericata DC. Prodr. II, 406. A large woody climber with slender glabrescent branches. Leaves 9-15 in. long; leaflets 3, membranous, green, glabrous above, glabrous or with a few adpressed hairs beneath, ovate-oblong cuspidate, base rounded-of lateral leaflets obliquely, 5-7 in. long, 3-3.5 in. across, petiole glabrous 4-8 in. long, petiolules '2 in., stipels subulate '15 in.; stipules linear '25 in. long. Inflorescence of lax 8-10-fid. axillary racemes, pedicels 35 in. long 1-3 together from swollen nodes towards upper third to fourth of peduncle 5-15 in. long, and in the axils of large boat-shaped deciduous bracts 1.25 in. long 1 in. wide glabrous on both surfaces rounded at apex except the acute or subacute lowest, forming at first a strobilate head. Calyx '75 in. long sparsely covered externally with brown deciduous irritating bristles, tube wide-campanulate hardly longer than the wide triangular teeth; flower-buds with a bracteole similar to bracts but much smaller and more early deciduous, at base of calyx. Corolla 2-2.25 in. long dull purple or white with purple spots; keel abruptly inflexed at tip standard 1 in. across 1.25 in. long; wings 5 in. wide. Pod oblong 4.5-6 in. long 2.25 in. across, wings along the sutures 5 in. wide, plaits 35 in. deep hardly crossing the wings; clothed in all parts with brown deciduous bristles; seeds 2-3. Bak. in Flor. Brit. Ind. II, 185. Citta nigricans Lour. Flor. Cochinchin. 557. Carpopogon imbricatum Roxb. Hort. Beng. 54. Stizolobium imbricatum Kuntze Rev. Gen. Plant. I, 208. Zoophthalmum nigricans Prain MSS.

Andamans; in the interior forests, common. Distrib. Himalayas from Kamaon, eastward; and throughout Indo-China.

Most nearly related, amongst Malayan species, to Stizolobium Junghuhnianum Kuntze (Rev. Gen. Plant. I, 208) from Java, which has very similar bracts. The pods, however, are in that species slightly narrower with rather narrower wings across which the plaits extend more completely. The branches, petioles, leaves and bracts of M. Junghuhniana are moreover strigosely hispid and the calyx and pods are more densely bristly. Nearly related also is M. cyanosperma K. Schum., from the Moluccas.

2. MUCUNA MONOSPERMA DC. Prodr. II, 406. A large woody climber with deciduous rusty down on young branches. Leaves 6-9 in. long; leaflets 3 thinly subcoriaceous green glabrous above, when young rather closely rusty-downy beneath, ovate-oblong cuspidate base rounded -of lateral leaflets obliquely, 3-4 in. long 2-2.25 in. across, petiole 3-5 in. long at first rusty, soon glabrescent; petiolules 25 in., stipels subulate ·15 in.; stipules linear ·2 in. Inflorescence corymbose 6-12-fid., axillary, peduncles usually 5-1 in. occasionally elongated 2.5-3 in. long, at first rusty-puberulous as are the pedicels 25-5 in. long; bracteoles at base of calvx lanceolate 6 in. long, exceeding the buds; bracts small triangular 15 long very early deciduous and leaving small scars at base of pedicels. Calya 4 in. long densely covered with pungent deciduous bristles, tube campanulate twice as long as unequal teeth; upper tooth truncate lateral deltoid lower linear. Corolla 1.5 in. long, purple; keel abruptly inflexed at tip, wings 25 in., standard 6 in. long 5 in. wide. Pod 2:75 in. long 2:25 in. wide broadly oblong, wings along the dorsal sutures 5 in. wide along ventral 25 in., plaits 3 in. high crossing the wings to their margins; clothed in all parts with brown deciduous bristles; seeds solitary. Wight in Hook. Bot. Misc. II, 346, Suppl. t. 12; W. & A. Prodr. 254; Miq. Flor. Ind. Bat. I, 214; Bak. in Flor. Brit. Ind. II, 185. M. anguina Wall. Pl. As. Rar. III, 19 t. 236, Carpopogon monospermum Roxb. Hort. Beng. 54; Flor. Ind. III, 283. C. anguineum Roxb. Hort. Beng. 54. Zoophthalmum monospermum Prain MSS.

Andamans; everywhere very common in the interior jungle.

3. Mucuna Biplicata Teysm. & Binnend. Cat. Hort. Bog. 261. A large woody climber 30-40 feet long with slender glabrous branches. Leaves 9-12 in. long; leaflets 3, chartaceous dull green, glabrous on both surfaces ovate-oblong, cuspidate, base rounded-of lateral leaflets obliquely, 6-8 in long, 5 in across, petiole glabrous 4-6 in long, petiolules 25 in., stipels subulate '15 in. long; stipules linear '2 in.; pulvinus swollen pubernlous. Inflorescence corymbose axillary 2 in. long; peduncle rustypubescent arising from an axillary node, its neck surrounded by a number of small triangular acute scaly bracts '15 in. long emitting at once 1-4 3-6-fid. branches 1-5 in. long, main rachis corymbosely branched or simple 15-18-fid., bracts at base of pedicels small triangular immediately deciduous; pedicels 2 in. long; bracteoles at base of calyx 2 in. long, oblong much shorter than buds. Calyx greenish-brown densely covered with deciduous pungent bristles, 35 in. long, tube wide-campanulate, teeth extremely short. Corolla dark-purple 1.75 in. long; keel abruptly in flexed at tip, wings 1.25 in. long, standard '75 in. wide. Pod hardly stipitate 3.5 in. long 1.75 in. wide; plaits oblique very close-set their edges double with reflexed margins, covered with close pungent brown bristly pubescence; marginal wings lobed between the plaits. *M. atropurpurca* Bak. in Flor. Brit. Ind. II. 186 in part and as to the Malacca plant only. *M. anguina* Scheff. Nat. Tijd. Ned. Ind. XXXII. 413 not of Wall. *Zoophthalmum biplicatum* Prain MSS.

MALACCA; Maingay, 590. PENANG; Gapis Pass, Ourtis 2989! PERAK; Ulu Kewanta, Scortechini 925! Sunga Ryah, etc. Kunstler 868! 3915! 6805! 8330! Wray 3746! DISTRIB. Sumatra (Forbes 2649!) Borneo.

There are at Calcutta both flowering and fruiting examples of Teysmann and Binnendyk's original species cultivated in the Buitenzorg garden; these are identical in every detail with this common Sumatra and Malay Peninsula plant. The pods much resemble those of M. atropurpurea, to which it comes nearest and with which it has been identified by Mr. Baker. But, besides the double edge to the plaits on the pods, whence the name, the Malayan differs from the Indian species in having larger leaflets, shorter inflorescences, a calyx with an almost truncate mouth and a collar of scaly bracts at the neck of the peduncle similar to but smaller than those that occur at the base of the peduncle in M. bracteata of the subgenus Stizolobium.

§ Carpopogon. Pods not plaited across their faces.

4. Mucuna acuminata Grah. in Wall. Cat. 5621. A slender creeper 20-30 feet long with sparingly adpressed-puberulous branches. Leaves 6-10 in. long; leaflets 3, membranous dull green glabrous above sparingly puberulous especially on the nerves beneath, ovate-oblong rather abruptly acuminate, base rounded or subtruncate-of lateral leaflets obliquely, 2.5-4 in. long 2-3.5 in. wide, petiole glabrous, 4-6 in. long; petiolules '25 in. adpressed-puberulous; stipels subulate '15 in. long, stipules linear 2 in. Inflorescence when young in strobilate heads, corymbose, axillary, 2-3 in. long, peduncle grey-pubescent arising from an axillary node, its neck with a collar of small triangular acute scaly bracts 15 in. long emitting at once 1-4 4-8-fld. usually bifurcate branches; bracts at base of pedicels deciduous large boat-shaped externally finely grey-pubescent, '75 in. long, '5 in. wide; pedicels greypubescent at length 4-6 in., bracteoles at base of calyx 3 in. long. deciduous, lanceolate, as long as buds. Calyx glossy pale-brown densely covered with deciduous pungent bristles, 5 in. long, tube wide campanulate twice as long as unequal teeth; upper tooth truncate, lateral widedeltoid, lower linear longer than the others. Corolla 1.75-2 in. long, keel not abruptly inflexed at tip; wings as long as keel and twice as long as the standard '7 in. wide. Pod not quite ripe, 3 in. long, 1.5 in. across, broadly winged down both sutures but not plaited on the faces, copiously clothed especially along the wings with deciduous yellowbrown irritating bristles; seeds 3. Zoophthalmum acuminatum Prain MSS.

Penang; Wallich (Cat. n. 5621)! Perak; Kinta, Kunstler 7038! SINGAPORE; Chan Chu Kang, Ridley 2075! DISTRIB. Java (Forbes n. 493!)

Mucuna gigantea DC. Prodr. II, 405. A long very slender 5. climber sometimes reaching 250 feet! with slender glabrous branches. Leaves 5-9 in. long; leaflets 3, subcoriaceous dark green, dull, glabrous on both surfaces; oblong cuspidate, base of terminal cuneate of lateral obliquely rounded, 4-5 in. long, 2.5 in wide, petiole glabrous 5 in. long; stipels subulate 15 in., stipules linear 2 in. long. Inflorescence a pendulous umbelliform corymb terminating a slender glabrous pedancle 4-18 in. long and bearing near its apex usually 3 sometimes 5-7 small projecting puberulous nodes each emitting 3-5 slender readily disarticulating greypubescent pedicels '75 in. long; bracts and bracteoles both minute and very early deciduous. Calya 5 in long green with a few pungent bristles, tube rather cylindric 5 in. across, teeth all very short the upper wide subtruncate, the other three in bud shortly triangular at length obsolete. Corolla sickly greenish-yellow or white 1.25-1.5 in. long, keel not abruptly inflexed at tip; wings 1-1.25 in., standard .75 in. long .6 in. wide. Pod broadly winged down both sutures faces smooth or with oblique cross ridges but never distinct plaits; 3.5-6 in. long, 2 in. across, clothed with deciduous yellow-brown irritating bristles; seeds 2-4. Wall. Cat. 5619; W. & A. Prodr. 254; Wight in Hook. Bot. Misc. II, 351, Suppl. t. 14; Miq. Flor. Ind. Bat. I, 213; Bak. in Flor. Brit. Ind. II, 186. M. corymbosa Grah. in. Wall. Cat. 5622. Dolichos giganteus Willd. Sp. Pl. III, 1041. Carpopogon giganteum Roxb. Hort. Beng. 54; Flor. Ind. III, 286. Stizolobium giganteum Kuntze Rev. Gen. Plant. I, 208. Zoophthalmum giganteum Prain MSS.

Andamans; Coco Group, Prain! Middle Andaman, Kurz! South Andaman, Liebig! Kurz! Man! Little Andaman, Prain! always close to salt-water creeks or in Mangrove-swamps. Narcondam, near sea beach, Prain! PERAK; Scortechini! PAHANG; Ridley 1227! DISTRIB. A littoral species on Indian, Indo-Chinese, Malayan and Polynesian Coasts.

Subgen. 2. Stizolobium. Annual climbers; seeds ovoid with a small lateral hilum.

6. MUCUNA PRURIENS DC. Prodr. II, 405. A slender annual climber with adpressed-pubescent branches at length glabrescent. Leaves 6-9 in. long; leaflets 3, membranous ovate-rhomboid, green glabrescent above grey-silky and lustrous beneath, the lateral pair very oblique truncate at base, all 3-5 in. long 2-3 in. wide; petioles 2.5-4.5 in. long, adpressed silky, petiolules 2 in. long, stipels 15 in. long subulate, stipules lanceolate 2 in long. Inflorescence of short-peduncled racemes varying from 1 in. to 1 foot in length and from 3-30-fid., drooping, rachis

finely silky, pedicels short 15-25 in. usually solitary from lateral projecting nodes; bracts 5 and bracteoles 3 in. lanceolate, grey-silky, lustrous. Calyx 4 in. long with a few pungent bristles, tube campanulate hardly as long as the lower lanceolate tooth and equalling the lateral lanceolate and upper triangular tooth. Corolla purple 1.25-1.5 in. long; keel slightly incurved, wings nearly as long, standard 6 in. long and about as broad. Pod 2-3 in. long 5 in. wide, turgid, ridged longitudinally, recurved in the lower half and abruptly hooked at the tip; clothed with dense, intensely pungent subpersistent bristles at first dark purplish brown at length steel grey to pale rusty-brown; seeds 5-6. Wall, Cat, 5616; Wight in Hook. Bot. Misc. II, Suppl. t. 13.; Bak. in Flor. Brit. Ind. II, 187. M. prurita Hook. Bot. Misc. II, 348; W. & A. Prodr. 255; Miq. Flor. Ind. Bat. I, 211. M. utilis Wall. ex Wight Ic. t. 280. Dolichos pruriens Linn. Syst. Ed. X, 1162. Stizolobium pruriens Pers. Synops. II, 299; Kuntze Rev. Gen. Plant. I, 208, Carpopogon pruriens Roxb. Hort. Beng. 54; Flor. Ind. III, 283.

ANDAMANS: Great Coco, near N. Andaman, common, Prain! PERAK; Kampong Kota, Wray 3326! DISTRIB. Throughout the tropics.

## 20. STRONGYLODON Vogel.

Twining herbs, with firm stems and with stipellate 3-foliolate leaves Flowers in long lax racemes. Calyx campanulate, gibbous; teeth short, obtuse, imbricated. Corolla much exserted; standard lanceolate, recurved; wings obtuse, more than a third as long; keel curved, as long as the standard, narrowed into a long beak. Stamens diadelphous anthers uniform. Ovary stalked, few-ovuled, style filiform beardless; stigma capitate. Pod oblong, turgid. Seeds as large as a bean, with a hilum running more than half round. Species 3, Polynesian.

Strongylodon ruber Vogel, Linnæa X, 585. An extensive climber with quite glabrous thin hollow but firm stems. Leaves 8 in. long, petioles 2 in. long glabrous; leaflets 3, bright green, glabrous on both surfaces membranous shining above, ovate, shortly bluntly cuspidate subequal, 4 in. long 2.5 in. wide, terminal rounded at base with petiolule 1 in., lateral obliquely cuneate at base with short petiolules; 3-nerved at base, central nerve with 2-3 pairs of arching lateral nerves all visible beneath; stipels lanceolate membranous 15 in. long, stipules triangular 25 in. long membranous. Inflorescence in copious axillary racemes with peduncles 4-6 in. long of 30-40 1-3 fld. fascicles of pedicellate flowers arising from small produced nodes with obsolete bracts; pedicels slender spreading, 5-75 in. long. Calyx glabrous 3 in. long tubular; teeth very short rounded; 2-bracteolate at base, bracteoles caducous. Corolla bright-red 1 in. long, standard lanceolate acute, the short obtuse wings

intimately attached to lamina of narrowly-lanceolate curved keel. oblong 3 in. long, obliquely pointed, distinctly stalked, 2 seeded. Waln. Ann. IV, 559; A. Gray, Bot. Amer. Explor. Exped. 446 t. 48; Thwaites Enum. 89; Bak. in Flor. Brit. Ind. II, 191. Rhynchosia lucida DC. Prodr. II, 389.

Andamans; common, Prain! King's Collectors! Distrib. Cevlon: Polynesia.

#### 21. ERYTHRINA Linn.

Trees with prickly branches. Flowers large, coral-red, in dense racemes, produced usually before the development of the large constantly 3-foliolate leaves. Calyx oblique, spathaceous, finally slitting down to the base or campanulate-bilabiate. Petals very unequal; standard always much exserted and considerably exceeding the keel and wings. Upper stamen free down nearly to the base or connate with the others half way up the filaments; anthers uniform. Ovary stalked, many-ovuled; style incurved, beardless; stigma capitate. Pod linear, fertile turgid and torulose throughout, or flat and seedless below. Species 25-30. principally tropical, in both the New World and the Old, and at the Cape.

Pods turgid and seed-bearing throughout their length; stipels replaced by ovate-glands as long as broad; seeds with a very large oval hilum :-

Calyx spathaceous, oblique not at all 2-lipped, splitting to the base down the back (§ Stenotropis); leaflets membranous subreniform or triangular, green on both surfaces; flowers narrow, standard entire at apex ... 1. E. indica.

Calyx campanulate, somewhat 2-lipped, not splitting to the base (§ Micropteryx); leaflets subcoriaceous ovateoblong, glaucous beneath; flowers broad, standard emarginate

Pods flat, seedless and indehiscent in their lower half (§ Hypaphorus); stipels replaced by oblong glands longer than broad; seeds with a small hilum; (calvx somewhat 2-lipped; leaves membranous ovate-acute, green on both surfaces; flowers narrow, standard entire at tip)

2. E. ovalifolia.

3. E. lithosperma.

Subgen. 1. Stenotropis Hassk. Calyx spathaceous, oblique not at all 2-lipped, finally split to the base down the back. Pod turgid and seed-bearing throughout.

1. ERYTHRINA INDICA Lamk Encyc. Meth. II, 391. A tree 60 feet high with thin grey bark, armed with minute conical dark-brown prickles. Leaves 8-12 in long; petioles 4-6 in long unarmed, when young densely brownish-grey puberulous when full-grown glabrescent 70

especially in the upper half; leaflets 3, membranous, uniformly bright green, densely brownish-grey puberulous when young when full-grown quite glabrous, terminal subreniform lateral pair slightly oblique triangular, all subcuspidate at apex and subtruncate at base, 4-6 in. long. terminal rather broader than, lateral hardly so broad as long; petiolules ·3-·4 in. long; stipels represented by ovate glands ·1 in. diam. that remain attached to the rachis on the fall of the leaflets; stipules flaccid lanceolate '4 in, long softly brown-puberulous early caducous. Inflorescence of dense racemes 4-6 in. long on stout spreading woody peduncles 3-4 in. long; flowers 1-3 in axils of small triangular puberulous deciduous bracts, pedicels 25 in. long at first brown-puberulous with 2 subulate puberulous deciduous bracteoles 15 in. long at base of calyx. Buds narrowly spindle-shaped slightly falcate puberulous. Calyx 1-1.25 in. long, soon glabrescent, mouth very oblique splitting to the base down the back the tip with 5 teeth of which 2 or casually 3 are narrowly subulate 2 in, long much exceeding the others. Corolla bright-red 2-2.5 in. long, standard 1 in. wide, wings and free keel-petals subequal about 5-6 in. long. Ovary softly grey-puberulous 2 in. long, stalked. Pod 6-12 in. long on a stalk 75-1 in. long, black glabrescent distinctly torulose 6-8-seeded, usually the lowest and 1-3 of the uppermost seeds abortive, valves ultimately irregularly shred, hardly distinctly dehiscent: seeds subreniform 6 in. long 4 in. wide testa warm-brown, hilum large oval dark-grey with pale margin. DC. Prodr. II, 412; Roxb. Flor. Ind. III, 249; Wall. Cat. 5963; W. & A. Prodr. 260; Wight, Ic. t. 58; Mig. Flor. Ind. Bat. I, 207; Bak. in Flor. Brit. Ind. II, 188. E. spathacea Wall. Cat. 5965, fide Baker. E. Corallodendrum Linn. Sp. Pl. 706, in part. E. cuneata Grah. in Wall. Cat. 5967, fide Baker.

ANDAMANS; on all the coasts common, Kurz! Prain! NICOBARS; common behind the sea beaches, King's Collectors! Perak; Scortechin! Malacca; fide Baker in Flora of British India. DISTRIB. Sea-shores of S.-E. Asia, from the Sunderbuns to the Malay Archipelago and Polynesia.

This, as a wild species, is purely littoral; where it occurs inland it has certainly been planted.

Mr. Baker refers here E. cuneata Grah. which the writer has not seen; also E. spathacea Wall. Cat. 5965. What Wallich's 5965 B. & C. (which were doubtfully identified with 5965 A) may have been, it is difficult to say; they were Himalayan plants and are not at Calcutta. But the Calcutta example of 5965 A is not named E. spathacea as in the Lith Cat., but is named E. stricta; the specimen belongs moreover to E. stricta and not to E. indica.

Subsect. 2. Microfferyx Walp. Calyx campanulate, more or less distinctly 2-lipped, but not splitting down to the base. Pod turgid and seed-bearing throughout.

2. ERYTHRINA OVALIFOLIA Roxb. Hort, Beng. 53. A tree 30-40. feet high with spreading branches, bark grey, stem 1.5-2 feet diam. armed with thick-based dark-brown prickles. Leaves 8-12 in long: petioles 4-5 in. long sparsely prickly, when young very sparingly pubernlous, when full grown quite glabrous; leaflets 3 subcoriaceous deep green above glaucous beneath quite glabrous on both surfaces. terminal ovate or ovate-oblong 4-6 in. long 2.5-3.5 in. across, lateral pair similar but rather smaller, base rounded or wide-cuneate apex obtuse or subacute; petiolules 25 in. long; stipels represented by ovate persistent glands 'l in. in diam.; stipules membranous orbicular deciduous 15 in, across. Inflorescence in lax 8-20-fld, racemes 3-6 in, long on stout spreading peduncles 5-8 in. long; flower 1-3 in axils of small broadly ovate deciduous puberulous bracts; pedicels puberulous 3 in. long with similar but smaller bracteoles at base of calyx. Buds narrowly ovate, puberulous. Calyx 5 in. long, 6 in. wide deeply 2-lobed. Corolla 2 in. long dark velvety-brown with deep scarlet tinge, standard 1.5 in. wide emarginate, wings .75 in., keel-petals coherent 1 in. long. Ovary softly grey-puberulous, stalked. Pod 6-8 in. long 6-8-seeded on a stalk 5 in. long, pale-brown puberulous, valves more distinctly dehiscing by the sutures; seeds subreniform '5 in. long, '3 in. wide, testa brown, hilum large oval. Roxb. Flor. Ind. III, 254; Wall. Cat. 5961; Wight Ic. t. 247; Benth. Pl. Jungh. 237; Miq. Flor. Ind. Bat. I, 207; Bak. in Flor. Brit. Ind. II. 189. E. holosericea Kurz, Journ. As. Soc. Beng. XLII, pt. 2, 69 as to flowers. Duchassaingia ovalifolia Walp. in Linnæa XXIII, 742.

Perak; Kinta, Kunstler 7215! Malacca; Maingay 528! Distrib. S.-E. Asia, from Assam and Bengal to the Malay Archipelago and Polynesia.

Mr. Kurz's Erythrina holosericea (Corallodendron holosericeum O. Kuntze, Rev. Gen. Pl. I, 172) is a spurious species manufactured by combining in one diagnosis a description of the flowers of E. ovalifolia and of the leaves of E. lithosperma; the mélange had been sent to Herb. Calcutta by an officer of the Indian Forest Department under the idea that it came from one tree. The citation of this species by Kuntze (loc. cit.) while that author is taking the opportunity to (as the writer thinks) unnecessarily restore an obsolete generic name, might lead to the conclusion that Kuntze had made an effort to verify the validity of the Kurzian species, as to the existence of which Mr. Baker had already expressed a doubt (Flora of British India II, 190). It is obvious, however, that Kuntze has done nothing of the kind and it would seem from this citation that the object of much of the bouleversement effected by priority-hunting "botanists" is less the restoration of generic names that have been improperly suppressed than a search for opportunities of posing as the authorities for species of whose characters they are ignorant.

In the Herbarium of Mr. Curtis, of the Penang Forest Department, is a solitary 72

specimen of an Erythrina belonging to this section, collected in Langkawi. The flowers are precisely those of E. suberosa, a glabrous form of which is common in Burma and Tenasserim; it may, therefore, well belong to that species. But the solitary branchlet is densely prickly whereas it is a feature of both the tomentose Indian and the glabrous Indo-Chinese form of E. suberosa to have almost unarmed branchlets. As moreover, Mr. Curtis' specimen is without leaves, the writer cannot on its authority alone, formally include E. suberosa among the Malayan species.

Subgen. 3. Hypaphorus Hassk. Calyx campanulate more or less distinctly 2-lipped, but not splitting down to the base. Pod flat seedless and indehiscent below, 1-3-seeded towards upper half.

3. ERYTHRINA LITHOSPERMA Miq. Flor. Ind. Bat. I, 209 not of Blume. A tree 40-60 feet high with spreading branches, bark white, stem 2 feet in diam., armed with strong prickles. Leaves 10-12 in. long; petioles 4-5 inlong with a few prickles or unarmed, when young brownish-grey puberulous soon glabrous; leaflets 3 membranous uniformly bright green densely brownish-grey puberulous when young soon quite glabrous, triangular-ovate cuspidate at apex, terminal wide-cuneate at base 4-6 in. long 3-4 across, lateral pair rounded at base rather smaller; petiolules ·3 in, long; stipels represented by oblong glands 15 in, long 1 in. across; stipules deciduous shortly ovate-acute flaccid densely puberulous. Inflorescence in short rather dense racemes 3-4 in. long on stout spreading woody peduncles 5-8 in. long, flowers 1-3 in axils of minute ovateacute bracts; pedicels 2 in. long puberulous, minutely bracteolate at base of calyx. Buds puberulous ovate. Calyx 3 in. long, softly persistently puberulous, equally 2-lipped. Corolla 1.5 in. long, standard oblong obtuse, crimson or crimson with white stripes, wings and keel 5 in long subequal. Ovary compressed faintly puberulous. glabrous pale-yellow, 4-8 in. long, 1.25 in. wide in the wing like compressed seedless indehiscent lower half to two-thirds, '6 in wide in the upper 1-3 seeded dehiscent portion; seeds subreniform 75 in. long 4 in. wide, testa almost black, hilum small elliptic pale. Bak. in Flor. Brit. Ind. II, 190. E. sumatrana Miq. Flor. Ind. Bat. Suppl. 304; Kurz, As. Soe. Beng. XLII, 2, 70. E. secundiflora Hassk. Pl. Jav. Rar. 378; Benth. Pl. Jungh, 237 not of Brotero. E. holosericea Kurz, Journ. As. Soc. Beng. XLII, 2, 69 as to leaves.

Penang; Wallich! Perak; at Kinta, Kunstler! at Waterloo, Curtis 2982! Scortechini (a MSS. description only.) Singapore; Hullett! Distrib. Indo-China, from the Shan Plateau, to the Malay Archipelago.

Mr. Kurz, as Mr. Baker remarks, has pointed out that the present species is Erythrina sumatrana Miq.; authentic examples of E. sumatrana in Herb. Calcutta, show that this is the case. But the only difference between E. sumatrana Miq. and E. lithosperma Bl. (ex Miq. in Flor. Ind. Bat.),—to which Mr. Baker has referred the Indo-Chinese plant that agrees in every respect with the Sumatra and Perak one.—

 $M_{\epsilon}^{ls}$  for a Flora of the Malayan Peninsula.

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those of E, sumatrana are rather larger than those of E. is in the size of the 38 are retained in the Index Kewensis but the writer lithosperma. Both believing that they do not deserve to be treated even as agrees with Mr. Bakequrther states that E. lithosperma Blume ex Miq. in Flor. separate varieties. Is E. lithosperma Bl. Cat. Bogor., which, according to Ind. Bat is not the Sahe Buitenzorg garden from Mauritius. Koorders and Kurz, was introduced va Herbarium, issue the common wild Java plant which Valeton, in their valuable, a in having rather smaller pods, under the name only differs from E. sumai in every case named the plant E. lithosperma Miq. E. lithosperma; they have howedragen II, these authors explain that Blume's not E. lithosperma Bl. In their b being the case the name E. lithosperma, but " E. lithosperma" is only E. indica; the is still available for the present species. on Miquel's authority, not as that of Bluno assist the serious student; Kuntze Here again Kuntze's pretentious Revisio fairon lithospermum and C. sumatranum claims the authorship of both, as Corallodeniled to make himself acquainted respectively, thus clearly indicating that he has with the characters of either.

> SPATHOLOBUS Hassk. S. Flowers small

Woody climbers, with 3-foliolate stipellate leave, the axils of or middle-sized, in ample terminal panicles, extending infonid nodes. the upper leaves, the pedicels densely fascicled at the upper two Galyx campanulate; teeth lanceolate or oblong-deltoid, the the keel connate. Corolla distinctly exserted, its petals subequalobtuse, nearly straight. Stamens diadelphous; anthers unifor apitate. sessile or stalked, 2-ovuled; style incurved, beardless, stigma tardily Pod flat, winglike, indehiscent, seedless below; thick, 1-seeded, pical dehiscent at tip. Species 10, the others Malayan and one Ta African.

Leaflets not twice as long as broad, the terminal leaflets dissimilar, rhomboid; (leaflets large 3 in. across manifestly pubescent beneath, rachis prolonged beyond attachment of lateral leaflets; flowers blue or purple) :-

Leaflets puberulous above, uniformly tomentose beneath; flowers 25 in. long, distinctly pedicelled

Leaflets glabrous above, tomentose only on the nerves beneath; flowers '15 in. long, very shortly pedicelled

Leaflets at least twice as long as broad, all subsimilar lanceolate or oblanceolate to ovate :-

Leaf-rachis hardly prolonged beyond the insertion of lateral leaflets, leaflets large 3.5 in. across (sparsely pubescent on the nerves beneath) Leaf-rachis distinctly prolonged beyond the insertion of

lateral leaflets, leaflets medium or small not more than 2 in. across :-

Petiolules and leaflets beneath finely adpressed puberulous (stipels manifest flexuous) :-

Petiolules twice as long as stipels, flowers pink, branches of panicle lax; leaflets elliptic-acuminate... 4. S. acuminatus.

1. S. ferrugineus

S. gyrocarpus.

S. bracteolatus.

Petiolules shorter than stipels, flowers white, branches of panicle strict, leaflets ovate-lanceolate acute 5. S. dubius.

Petiolales and leaflets beneath glabrous :-

Leaflets thickly coriaceous (oblong, stipels obscure rigid) flowers purple, calyx densely rusty-pubescent... 6. S. crassifolius. Leaflets chartaceous, flowers white, calyx glabrescent or puberulous :-

Leaflets oblong, stipels obscure rigid, calyx glabrescent, branches of panicle strict

7. S. Maingayi.

Leaflets oblanceolale, stipels manifest flexuous, calyx finely puberulous, branches of panicle lax ... 8. S. Ridleyi.

1. Spatholobus ferrugineus Benth. Pl. Jungh. 238. A robust woody climber 30-60 feet long with a stem 3-6 in thick; branchlets densely rusty-tomentose, brown beneath the tomentum, cylindric. Leaves 9 in. long; leaflets 3, coriaceous dull green puberulous above, everywhere rusty-pubescent beneath, terminal ovate apex obtuse base rounded, 5-6 in. long 3 in. across, lateral obliquely elliptic 4.5-5.5 in. long as wide as terminal, lateral nerves 5-7 pairs ascending and midrib prominent beneath, cross-nerves and fine reticulate venation very distinct; petiole 3-4 in. long rusty-pubescent, petiolules \*25 in. also densely rusty; stipels subulate small; stipules broad-based triangular 25 in. long, very densely rusty, deciduous. Inflorescence 8-10 in long, in lax axillary panicles with stout densely rusty-pubescent somewhat flattened peduncles, branches 4-6 in. long again paniculate the bracts at their bases triangular subpersistent; pedicels distinct '2 in. long in fascicles of 2-5, bracteoles shorter than buds. \*Calyx densely rusty-pubescent 2 in. long, teeth deltoid shorter than tube subequal except the rounded slightly emarginate upper. Corolla claret-coloured to dark-blue, 25 in. long, standard oblong deeply notched. Pod 3-5 in. long, softly velvety, semi-transparent except at the seed-bearing tip, '7 in wide below '3 in. wide at seed-hearing apex. Miq. Flor. Ind. Bat. I, 204. Drebbelia ferruginea Zoll. in Nat. en Geneesk. Arch. III, 79.

Perak; very common at low elevations, Wray 1941! 2008! 2381! 3258! Scortechini 213! 1466! Kunstler 3566! 6862! 7904! Penang; Govt. Hill, Kiny! Abrams! Curtis! MALACCA; Maingay 530! Griffith! Derry 1203! Goodenough 1437! SINGAPORE; Hullett 211! Ridley 3609! DISTRIB. Sumatra, Java, Borneo.

From Singapore comes also a form collected twice by Mr. Ridley (n. 5578! n. 6394!) with a close red-silky tomentum beneath. This bears to ordinary S. ferruginens very much the relationship that Butea sericophylla Wall. bears to S. Rowburghii (Butea parriflora) and it has not therefore been here separated as a variety, though it is certainly a very distinct "form" of S. ferrugineus. While very near S. gyrocurpus this species is quite readily separable by its nearly always rather smaller leaves; its always different tomentum; its always larger flowers with much longer pedicels, and its differently shaped more persistent bracts. The fruits are however, exceedingly similar; but this is true also of S. acuminatus, S. riparius, S. squamiger and S. Listeri, four species that have fruits hardly distinguishable from those of S. gyrocarpus and S. ferrugineus.

Judging from the field notes of Mr. Kunstler and from a manuscript description written by Father Scortechini, S. ferrugineus, though a large climber, rarely if ever attains the dimensions of S. gyrocarpus, the next species.

SPATHOLOBUS GYROCARPUS Benth. Pl. Jungh. 238. A robust woody climber sometimes over 100-150 feet long with a stem 4-6 in. thick; branchlets closely shortly rusty-pubescent, black beneath the tomentum, slightly angular. Leaves 12 in. long; leaflets 3 subcoriaceous bright green and glabrous above rusty-pubescent on all veins and nerves beneath, terminal obovate-rhomboid apex rounded with a short point base cuneate, 5-6 in. long, 4.5-5 in. wide, lateral obliquely elliptic 5-6 in. long 3.5-4 in. wide base obliquely rounded apex as in terminal; lateral nerves 6-8 pairs ascending and midrib prominent beneath, cross-nerves and fine reticulate venation very distinct; petiole 4-6 in. rusty puberulous, petiolules 3 in. also rusty; stipels subulate small; stipules broadbased ovate-lanceolate 3 in. long very early deciduous. Inflorescence in lax axillary panicles sometimes 12 in. long with stout somewhat flattened rusty-puberulous peduncles, branches 6-8 in. long again paniculate, the bracts at their bases small lanceolate early deciduous; pedicels very short, bracteoles at base of calvx linear shorter than buds early deciduous. Calyx grey silky-pubescent 1 in. long, teeth deltoid shorter than the tube subequal except the triangular slightly notched upper. Corolla deep-claret to dark-blue, 15 in. long, standard wide-orbicular deeply notched. Pod 3-5 in. long 1 in. wide below, seed-bearing tip 3 in wide, softly velvety, semitransparent except at the seed-bearing apex. Bak. in Flor. Brit. Ind. II, 193; Miq. Flor. Ind. Bat. I, 204. Butea gyrocarpa Wall. Cat. 5442.

Perak; very common at low elevations, Kunstler 3181! 7770! 8182! 10390! 10458! PENANG; Wallich 5442! Stoliczka! DISTRIB. Philippines.

This, though common, appears to be hardly so frequent as the last species which it much resembles, especially as regards pods. The tomentum of this species is however, less dense and less red than in S. ferrugineus and the flowers are about half the size. This has never been sent to Calcutta from Malacca though S. ferrugineus is very plentiful there.

Spatholobus bracteolatus Prain. A slender creeper 15-20 feet long with sparsely rusty-pubescent branches. Leaves 10-12 in. long; leaflets 3 ovate-acute or shortly acuminate, the tip slightly mucronate, subcoriaceous glossy bright green on both surfaces very sparsely beset with short rusty adpressed hairs, midrib beneath prominent more densely adpressed-pubescent, lateral nerves ascending 8-9 pairs prominent, cross-nerves distinct, terminal and lateral subequal subsimilar-8-9 in. long, 3.5 in. across; petiole 2-2.5 in. long densely adpressed rusty-pubescent, scarcely prolonged beyond attachment of lateral leaflets, petiolules 3 in. long also densely rusty; stipels short subulate, stipules 25 in. long, deciduous, membranous, densely rusty, lanceolate; leaves towards ends of branches sometimes 1-foliolate. Inflorescence in terminal and axillary panicles 1.5-2 ft. long, branches 3-4 in. long again paniculate, with smaller sometimes 1-foliolate leaves at their bases, or bractless; pedicels very short, bracteoles at base of calyx lanceolate 2-25 in. long, longer than buds, early deciduous. Calyx pale-brown pubescent, 15 in. long, lower teeth sublinear central longer than lateral all shorter than calyx tube, upper lip triangular notched at apex. Corolla shortly exserted small, colour not noted, standard orbicular-oblong slightly retuse. Pod not seen.

PERAK; in dense jungle on Gunong Batu Pateh, at 3000-4000 feet, Kunstler n. 8079!

This in externals more resembles S. Roxburghii than it does any other Malayan species, and may possibly be the plant from Penang, noted by Mr. Baker as having been confused by Dr. Wallich with S. gyrodarpus under Cat. n. 5442; at Calcutta, however, all the specimens of Cat. n. 5442 are genuine S. gyrocarpus. The present plant was not identified with any species at Kew and in any case it is certainly not a form of S. Roxburghii; it differs in having smaller flowers; narrower, relatively longer bracteoles, and much longer stipules—the latter in S. Roxburghii are triangular and though wider at the base are only 15 in. long. The stipels on the other hand are small and obscure and the most striking difference between this plant and S. Roxburghii, or indeed between it and any other species of Spatholobus is that the rachis of the leaf is so shortly prolonged beyond the attachment of the lateral pair of leaflets that the leaf is at times subdigitately 3-foliolate.

4. Spatholobus acuminatus Benth. Pl. Jungh. 238. A robust climber with branches at first minutely downy soon glabrescent. Leaves 8-10 in. long; leaflets 3, all oblong-cuspidate rounded at the base, 4-6 in. long, 1.5-2 in. across, subcoriaceous, pale green on both surfaces glabrous above, under the lens very minutely and sparsely puberulous beneath, midrib prominent beneath very sparsely shortly puberulous. lateral nerves 8-10 pairs spreading very slender, fine reticulations distinct but not prominent; petiole 2-4 in. long glabrescent, petiolules ·2 in adpressed puberulous; stipels short subulate, stipules ovate-lanceolate 25 in. long 15 in. wide, very early deciduous. Inflorescence in short axillary panicles 6-8 in. long, branches 1.5-2 in. long again paniculate; pedicels slender usually 2-3 together ·2 in. long. Calyx puberulous ·15 in. long, teeth oblong obtuse half as long as tube the upper slightly emarginate. Corolla 4 in. long, bright red (fide Baker), standard orbicular emarginate. Pod 3-5 in. long, softly velvety, semi-transparent except at seed bearing tip, '7 in. wide below '3 in. wide at tip. Miq.

Flor. Ind. Bat. I, 204; Bak. in Flor. Brit. Ind. II, 194. Sapindacea Wall. Cat. 8082. Butea acuminata Wall. Cat. 5443.

Penang; Wallich 8082! Andamans; common, King's Collectors! DISTRIB. Martaban.

The solitary Malayan specimen at Calcutta that appears referable to this species is one issued by Dr. Wallich as Supindacea sp. (Cat. n. 8082); this specimen is not dealt with in the Flora of British India. So far as it goes it agrees better with Dr. Wallich's Martaban specimens of S. acuminatus (Cat. n. 5443) than it does with any Malayan species of Spatholobus, to which genus it manifestly belongs; the specimen is, however, only in very young flower. No one has met with it in Penang since Dr. Wallich collected it.

Mr. Baker's description of S. acuminatus does not apply to Dr. Wallich's Butea acuminata in so far as the lengths of the panicles and of the pedicels are concerned. His description would apply to Wall. Cat. 5907 (Pongamia rosea Grah.) which Mr. Baker also includes here; Pongamia rosea certainly is a Spatholobus but is a species very distinct from S. acuminatus. There are not at Calcutta examples of Wall. Cat. 5908 or Wall. Cat. 9054; both are here excluded because Mr. Baker expresses a doubt regarding both. The first may indeed prove to be the same as Spatholobus riparius Prain; of the second nothing can be said because, in the Flora of British India, it is referred not only to S. acuminatus, but also to Derris thyrsiflora.

The Andamans specimens are absolutely identical with Wallich's original specimens (Cat. 5443) from Martaban.

SPATHOLOBUS DUBIUS Prain. A large climber 100-150 feet long, stem 6-8 in. diam, with round adpressed-puberulous branches. Leaves 6-8 in. long; leaflets 3 ovate-acuminate base rounded the tip slightly mucronate, coriaceous glossy bright green, glabrescent above adpressedpuberulous beneath, lateral nerves ascending 8-9 pairs prominent beneath, cross-nerves distinct; terminal 2-6 in long 15-3 in wide, lateral subsimilar rather smaller; petioles 1:5 in. long puberulous, petiolules 15 in. pubescent; stipels subulate 15-2 in. long, stipules lanceolate 2 in. deciduous; leaves towards ends of branches sometimes Inflorescence in terminal and axillary spreading panicles the former sometimes 8 in. the latter 4 in. long, sometimes 2-3 from same axil. Bracts lanceolate persistent adpressed-pubescent 15 in. long equalling the pubescent solitary or fasciculate pedicels; bracteoles minute. Calyx adpressed-pubescent, 12 in., campanulate, teeth short triangular except the 2-fid upper. Corolla 25 in. long, pure white, standard orbicular retuse. Pod not seen.

Perak; Gunong Bubu, 800-1200 feet, Kunstler 7585! Penang; Govt. Hill, Curtis 2970!

A very distinct species apparently nearest to S. littoralis Hassk. from which it differs in having the lower lip of calyx toothed and the leaves uniformly puberulous beneath. The shortness of its petiolules, which are equalled and often exceeded in length by the subulate stipels, renders the species easily distinguishable.

SPATHOLOBUS CRASSIFOLIUS Benth. Pl. Jungh. 238. Apparently

a strong climber, branches at first rusty-pubescent at length glabrescent. Leaves 8-10 in. long, all oblong-cuspidate, cuneate at the base, 4-6 in. long 1.5-2 in. wide, thickly rigidly coriaceous, dark green and quite glabrous on both surfaces midrib prominent beneath glabrous, lateral nerves 6-7 pairs and secondary nervation very slightly raised; petiole 2-4 in. long glabrous, petiolules 2 in. glabrescent; stipels short subulate often obscure, stipules lanceolate 2 in. long very early deciduous. Inflorescence of short axillary panicles 8-9 in. long, branches about 2 in. long, again paniculate, peduncles rusty-pubescent with a few ovate-acute deciduous leaf-scales at their base; pedicels very short, rusty-pubescent. Calyx densely rusty-velvety, 'l in. long, teeth all deltoid shorter than the tube. Corolla 2 in. long, dark-purple, limb of standard much broader than deep, deeply emarginate at apex subcordate at junction with claw. Pod not seen; when immature with a stalk (fide Baker.) Bak. in Flor. Brit. Ind. II, 194. Pongamia? crassifolia Grah. in Wall. Cat. 5913.

PENANG; Wallich! DISTRIB. Silhet.

This is very distinct by reason of its leaves and (from Mr. Baker's description) on account of its stipitate pod. Dr. Wallich's original specimens from Silhet and Penang seem undoubtedly examples of one species; strangely, it has not been sent again to Calcutta from either locality.

7. Spatholobus Maingayi Prain. A large climber with glabrous branches. Leaves 4-5 in. long; leaflets 3 ovate-acute base rounded tip slightly mucronulate, thickly coriaceous glabrous on both surfaces, lateral nerves ascending 5-6 pairs slightly prominent beneath cross-nervation distinct but not prominent; terminal 3 in. long 1.75 in. wide; lateral rather smaller; petiole 2 in. glabrous, petiolules .25 in. quite glabrous; stipels subulate .1 in. long, stipules ovate .1 in. long, deciduous. Inflorescence in terminal and axillary panicles 6-8 in. long. Bracts minute subulate persistent puberulous, as are the rachis and pedicels shorter than calyx; bracteoles very minute. Calyx adpressed-puberulous .12 in. long, campanulate, teeth all short rounded. Corolla white .25 in. long, the standard orbicular deeply emarginate. Ovary hirsute 2-ovuled.

Malacca; Maingay 611! Perak; Kunstler 3535! 4652! 6906! 10428! Scortechini 206! 1537! Singapore; Ridley!

This evidently quite common species has never yet been reported in fruit. It appears from a note in Herb. Calcutta that Mr. Kurz had supposed it might be the same as S. macropterus Miq.; the flowers, however, differ slightly and, in their venation, the leaves of the two species differ markedly. Father Scortechini on the other hand thought when he collected it that this might be Derris (Aganope) macrophylla, a reasonable supposition in the absence of fruit since the flowers of Spatholobus are very like the flowers of Aganope and since the obscureness, and indeed at times apparently total absence, of stipels from the leaves of this species leads to their being

easily overlooked. There are, however, very few specimens without stipels on some of their leaves and the writer has therefore followed Mr. Kurz in referring the plant to Spatholobus. The matter cannot, however, be conclusively settled till pods are obtained and examined. The only other species with equally obscure stipels is S. crassifolius, of which, however, Mr. Baker has seen immature fruit.

8. Spatholobus Ridleyi Prain. A climber with glabrous slightly-angled branches. Leaves 6 in. long; leaflets 3 subequal oblanceolate apex acuminate tip mucronulate base cuneate, papery quite glabrous on both surfaces, 3-3·5 in. long 1-1·25 in. wide; petiole glabrous 1·5 in. long, petiolules glabrous 2 in. long; stipels small rigid subulate, often very obscure; stipules lanceolate 25 in. long subrigid parallel-veined. Inflorescence in axillary racemes 3 in. long 1 in. wide, bracts and bracteoles minute deciduous. Calya 12 in. campanulate adpressed-pubescent, upper tooth truncate the others rounded half as long as tube, pedicels 2 in. long, adpressed-puberulous. Corolla 25 in., white, standard orbicular, limb slightly auriculate, apex retuse. Pod 4 in. long, 1 in. wide below, seed-bearing tip 4 in. across; sparsely puberulous, reticulate-veined, semitransparent except at apex.

SINGAPORE; Ridley 6401!

A very distinct species though nearest to S. macropterus Miq.

## 23. INDIGOFERA Linn.

Herbs or shrubs more or less densely clothed with adpressed hairs, with (in Malayan species) compound odd-pinnate leaves. Flowers small in copious axillary racemes. Galyx minute campanulate; teeth 5, subequal or the lower longest. Corolla caducous, standard obovate; keel straight, not beaked, laterally spurred near base. Stamens diadelphous, anthers uniform apiculate. Ovary sessile many-ovuled; style short incurved, stigma capitate penicillate. Pod linear-cylindric several-seeded. Species about 250; in all tropical regions and in temperate South Africa.

The genus is hardly a Malayan one; the above definition applies, as to foliage, only to the species that occur in the Malay Peninsula.

Herbaceons; stems densely pubescent; pod short straight pubescent

Shrubby; stems faintly hoary; pod glabrous:-

... 1. I. hirsuta.

Calyx deeply cleft, about half as long as corolla; peds reflexed:—

Leaflets ovate-acute; racemes dense, pods short much recurved ...

Leaflets obovate-obtuse; racemes lax, pods longer straight

or only slightly recurved at the tip

Calyx shortly toothed, hardly 1/3 as long as corolla; pods
ascending

... 4. I. galegioides.

I. tinctoria.

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1. Indigorera hirsuta Linn. Sp. Pl. 751. An annual or biennial suberect herb 1-3 or 4 feet high; stem densely covered with soft short spreading grey or brown pubescence. Leaves 2-5 in. long, short-petioled; leaflets terminal and in 2-5 opposite pairs, obovate 1-2 in. long, membranous greyish-green above, glaucous beneath, densely coated with adpressed hairs; stipules setaceous, plumose. Racemes 2-6 in. long, short-peduncled, very dense-fld. Calyx densely pubescent, 15 in. long; teeth setaceous plumose; tube very short. Corolla 2 in. long, little exserted, purple or red. Pod 5-7 in long, straight, densely covered with spreading grey pubescence, 6-S seeded. DC. Prodr. II, 228; Roxb. Flor. Ind. III, 376; Jacq. Ic. I, 569; Wall. Cat. 5450; Hook. Comp. Bot. Mag. t. 24; W. & A. Prodr. I, 204; Miq. Flor. Ind. Bat. I. 304; Bak. in Flor. Brit. Ind. II, 98. I. ferruginea Schum. & Thonn. Pl. Guin. 370.

PAHANG; Ridley! PENANG; Curtis! MALACCA; Ridley! SINGAPORE; Hullett! DISTRIB. Tropics generally.

2. Indigofera Anil Linn. Mantiss. 272. A shrub 4-6 feet high with twiggy woody thinly silvery branches. Leaves 2-3 in. long, petioles 5-1 in.; leaflets terminal and in 5-8 opposite pairs, ovate-acute 5-1 in. long, membranous, green; stipules subulate. Racemes 1-2 in. long, dense-fld., nearly sessile. Calya 04 in. silvery, teeth acute as long as tube. Corolla purple 15-2 in., distinctly exserted. Pods 4-6 in. long 1 in. thick glabrescent retro-falcate 4-6-seeded. Miq. Flor. Ind. Bat. I, 307. Bak. in Flor. Brit. Ind. II, 99. I. tinctoria var. Anil Kurz Journ. As. Soc. XLV, pt. 2, 269 excl. all syn.

Andamans; Port Blair, not uncommon. A native of America but not uncommon in cultivation and as an introduced escape or weed in the Old World. This is apparently much commoner in Indo-China than it is in India; it is frequently mistaken for *Indigofera coerulea* Roxb. which however appears to be exclusively an Indian plant.

3. Indigofera tinctoria Linn. Sp. Pl. 751. A shrub 4-6 feet high with twiggy woody thinly silvery branches. Leaves 1-2 in. long, petioles '5-1 in.; leaflets terminal and in 4-6 opposite pairs, obovate-oblong, '5-1 in. long membranous, green; stipules subulate. Racemes 2-4 in. long, lax-fld. nearly sessile. Calyr '04 in., silvery, teeth acute as long as tube. Corolla reddish-yellow '15-2 in., distinctly exserted. Pods '7-1 in long '1 in thick, glabrescent straight, or slightly recurved towards tip, 8-12-seeded. DC. Prodr. II, 224 (var. a. only); Roxb. Flor. Ind. III, 379; Wall. Cat. 5474; W. & A. Prodr. I, 202; Wight, Icon. t. 365; Miq. Flor. Ind. Bat. I, 306; Bak. in Flor. Brit. Ind. II, 99. I. indica Lamk, Encyc. Meth. III, 245. I. sumatrana Gærtn. Fruct. II, 317, t. 148.

Penang; cultivated, Curtis! Malacca; Griffith! Pangkore; Scortechini! Pahang; "growing near Sultan's tomb," Ridley! Singapore;

Ridley! A native apparently of the Old World; often cultivated and occasionally occuring as an escape.

4. INDIGOFERA GALEGIOIDES DC. Prodr. II, 225. A tall shrub, reaching 8 feet high, with twiggy woody branches at first adpressed-pubescent at length glabrescent. Leaves distinctly petioled, 8-12 in. long; petioles '5-2 in.; leaflets terminal and in 6-12 lateral pairs, oblong obtuse, of varying size generally 5 in. long by 3 in. across but sometimes 1-2 in. long, membranous, green above glaucescent beneath very obscurely adpressed hirsute; stipules distinct, stipels minute. Racemes 2-3 in. long, short-peduncled, very dense-fid. Calyx '04 in. long, hoary, teeth very short, deltoid. Corolla pale-red '4-5 in., finely canescent externally. Pods glabrous 2:5-3 in. long, cylindric, straight, beaked, 15-18-seeded. Miq. Flor. Ind. Bat. I, 310; Bak. in Flor. Brit. Ind. II, 100. I. uncinata Roxb. Fl. Ind. III, 382; Wall. Cat. 5472. I. Finlay-soniana Wall. Cat. 5488.

MALAY PENINSULA; Perak; Kunstler, 316! Malacca, Griffith! Lang-kawi, Gurtis, 2865! DISTRIB. Ceylon; Indo-China; S. China; Philippines; Malay Archipelago.

Very easily distinguished from other species by the fact that its pods instead of spreading or being reflexed, are fastigiately grouped with their apices pointing in the direction of the apex of the peduncle. It is often planted for ornament and is perhaps not really native in Malaya.

#### 24. SESBANIA Pers.

Soft-wooded shrubs or trees with long, very narrow abruptly \* pinnate leaves with very numerous deciduous linear-oblong obtuse mucronate leaflets. Flowers in axillary racemes. Calyx campanulate shallowly 2-lobed or 5-toothed. Corolla much exserted; petals all with long claws; standard broad keel straight and obtuse or subrostrate and recurved. Stamens 2-adelphous; anthers uniform. Ovary stipitate, linear, manyovuled; style filiform, incurved glabrous; stigma capitate. Pod very long and narrow, dehiscent; septate between the very many seeds. Species about 40, cosmopolitan in the tropics.

Flowers small, bud straight (§ Eusesbania); annual shrubs:—
Pod twisted pendulous; stems thick pith-like; flowers '75
in long ... ... ... ... 1. S. paludosa.
Pod not twisted usually ascending; stems woody very
slender; flowers '4 in. long ... ... ... 2. S. cannabina.
Flowers large, bud falcately recurved (§ Agati); a tree ... 3. S. grandiflora.

1. Sesbania paludosa Roxb. Hort. Beng. 56 (sub Aeschynomene). A large tree-like herb with annual stems reaching 12 feet in height,

<sup>\*</sup> By an unfortunate oversight this character is not made prominent in the Keys to the tribes and genera, p. 22 and p. 33.

2 in. in diam. full of white soft pith, quite unarmed as are the leaf rachises. Leaves 4-12 in. long, sessile, leaflets 10-30 pairs dark-green sparingly hirsute above. Racemes drooping 8-12-fld., 4-5 in. long equalling or slightly exceeding the leaves in whose axils they arise. Flowers yellow the standard externally dotted with small purple spots 75 in. long. Pads 10-12 in. long flexible with strong not indented sutures always pendulous and always twisted. S. grandiflora Miq. Flor. Ind. Bat. I, 288, not of Pers. S. cochinchinensis Kurz Journ. As. Soc. Beng. XLV, 2, 271, not of DC. S. punctata Benth. MSS. in Herb. Kew, not of DC. S. aculeata VAR. paludosa Bak. in Flor. Brit. Ind. II, 115 (in part only and excluding the syn. Aeschynomene uliginosa). Aeschynomene paludosa Roxb. Hort. Beng. 56; Flor. Ind. III, 333, not S. paludosa Jacq.

Kedah; open marshy ground near rice-fields, Kunstler 1712! Distrib. Bengal; Burma; China; Java.

Roxburgh, who knew the Bengal Sesbanias well, has left of most of them, under the name of Aeschynomene, unmistakeable descriptions and figures which subsequent Indian botanists have for some reason treated with little consideration. A careful examination of living plants shows, however, that Roxburgh's treatment of the forms is probably accurate, and his views of the limitation of the species are certainly preferable to any that have since been proposed.

The present species is the familiar Kathsola (as opposed to the true Sola which is Aeschynomene aspera), so common in marshes throughout the Gangetic Delta.

Though recognised as distinct by Prof. Miquel, that author unfortunately has used a specific name that is pre-occupied in the genus. Mr. Kurz thought it might be Coronilla cochinchinensis Lour. but that species has erect torulose pods and the identification is therefore impossible. Mr. Bentham has suggested its being Sesbania punctata but the pods and the stem structure forbid this identification also. As Sesbania paludosa Jacq. is not this species but is Roxburgh's Aeschynomene uliginosa it seems best to conserve Roxburgh's specific epithet paludosa for the very distinct plant to which he originally applied it.

Dr. Kuntze (Rev. Gen. Plant. I, 181) would reduce this to Sesbania ægyptiaca! un excellent instance of the unscientific use of the imagination.

2. Sesbania cannabina Pers. Synops. II, 316. A tall and slender unarmed woody herb, stems reaching 20 feet in height without exceeding 5 in. in diam. at base. Leaves 2-3 in. long, sessile; leaflets 8-20 pairs, glabrous, very dark green. Racemes short (under 1 in.) but distinctly peduncled, 2-4-fld.; flowers yellow, the standard externally closely purple-streaked, 4 in. long. Pods very often solitary rarely more than 2, spreading or pendulous rarely erect, 4-8 in. long; sutures stout straight, valves not depressed between the seeds. DC. Prodr. II, 265; Miq. Flor. Ind. Bat. II, 286, excluding syn. S. cannabina W. & A. S. affinis Schrad. in DC. Prodr. II, 265. S. polyphylla Miq. Flor. Ind. Bat. II, 288. S. aculeata var. cannabina Bak. in Flor. Brit. Ind. II, 115. Aeschynomene cannabina Retz. Obs. V, 26; Roxb. Flor. Ind. III, 335.

Tongkah; Curtis' Collector 2861! DISTRIB. Lower Bengal, commonly cultivated; Lower Burma; Java.

This species has, like the last, been much misunderstood. It is the familiar Dunchi plant of Bengal, where it is widely cultivated; to a slight extent on account of its fibre which, being more resistent to water than other kinds is employed in making fishing nets and lines; to a greater extent for its long lithe stems that are used as the wattles of which are constructed the walls of the houses in which Piper Betle is grown in Bengal. Probably this is an introduced plant in Malay countries.

3. Sesbania grandificra Pers. Synops. II, 316. A soft-wooded tree 20-30 feet high and 8-10 in. in diam. at base, with virgate terete branches. Leaves 6-12 in. long, leaflets 16-30 pairs, linear-oblong glabrous, pale-green. Racenes short (1 in. long), 2-4-fld., but distinctly peduncled; flowers white or pink. Calyx 8 in. deep, glabrous, shallowly 2-lobed. Corolla 3-3.5 in. long. Pods up to 20 in. long, falcate or straight, firm, sutures thick straight, valves slightly depressed between the seeds. Bak. in Flor. Brit. Ind. II, 115. Agati grandiflora Desv. Journ. Bot. I, 120, t. 4; Miq. Flor. Ind. Bat. I, 289.

PERAK; Thaipeng, Scortechini 525! SINGAPORE; Kunstler 1147! Hullett 819! DISTRIB. Mascarene Islands to N. Australia, usually planted.

The Agati tree, which is very doubtfully native either in India or Malaya, is often grown as a support for Pepper-vines in Southern India. In Northern India it is chiefly planted for the sake of its showy flowers.

#### 25. TEPHROSIA Pers.

Herbs or undershrubs with compound odd-pinnate or, rarely, simple leaves; the leaflets opposite, subcoriaceous. Flowers in terminal and leaf-opposed racemes. Calyx campanulate with distinct subequal teeth. Corolla much exserted, petals clawed, standard suborbicular; keel incurved, not beaked. Stamens diadelphous, anthers uniform, obtuse. Ovary sessile, linear, many-ovuled; style much incurved, flattened or filiform, silky or glabrous; stigma capitate often penicillate. Pod linear flattened, many-seeded, 2-valved, continuous or obscurely septate between the seeds. Species about 100, in all tropical regions.

The above definition applies only to the species of the Malay Peninsula.

An undershrub; calyx-teeth short, deltoid ... 1. T. candida.

Herbs; calyx-teeth narrow cuspidate as long as the tube:—

Pods glabrescent ... ... 2. T. purpurea.

Pods clothed with persistent brownish silky hairs ... 3. T. Hookeriana.

1. Tephrosia candida DC. Prodr. II, 249. A low shrub, 4-6 feet high, with slender woody grooved branches clothed with brown or grey 84

persistent velvety pubescence. Leaves short-petioled 6-9 in. long; leaflets terminal and in 9-12 opposite pairs, ligulate, acute, 1.5-2 in. long, green and glabrous above, grey and thinly silky beneath; stipules setaceous, ascending. Racemes copious, terminal and lateral, 6-9 in. long, lower flowers fasciculate; pedicels 25-4 in., silky. Calyx densely silky, 2-25 in. long, teeth much shorter than tube. Corolla 75-1 in., rose or white, standard densely silky. Pods 3-4 in. long, 10-15-seeded, slightly recurved, clothed with adpressed brown silky hairs; style silky, flattened. Wall. Cat. 5627; W. & A. Prodr. 210; Bak. in Flor. Brit. Ind, II. 111. Robinia candida Roxb. Flor. Ind. III, 327. Kiesera sericea Reinw. in Miq. Flor. Ind. Bat. I, 291. Xiphocarpus candidus Hassk. Pl. Rar. Jav. 336.

SINGAPORE; Anderson! Hullett! DISTRIB. Himalayas, Western Indo-China, Malay Archipelago.

2. Tephrosia purpurea Pers. Synops. 329. A copiously branched subcreet herbaccous perennial with slender firm terete glabrescent stems. Leaves short-petioled 3-6 in. long; leaflets terminal and in 6-10 opposite pairs, narrowly oblanceolate obtuse, 5 in. long, green and glabrescent above, glaucous and obscurely silky beneath; stipules subreflexed. Racemes copious all lateral, 3-6 in. long, lax fld.; lowers flowers fasciculate; pedicles '1-'2 in., bracteoles minute. Calyx densely silky '1-'15 in. long; teeth linear as long as tube. Corolla '25-'3 in. long, red, standard thinly silky. Pods 1'5-2 in. long, 6-8-seeded, slightly recurved, glabrescent; style glabrescent; stigma penicillate. DC. Prodr. II, 251; Wall. Cat. 5638; W. & A. Prodr. 213; Miq. Flor. Ind. Bat I, 296; Bak. in Flor. Brit. Ind, II, 112. Galega purpurea Linn. Sp. Pl. ed. II, 1063; Roxb. Flor. Ind. III, 386.

Malacca; Griffith! Penang; Curtis! Pahang; Ridley! Selangor; roudsides, Ridley 7291! DISTRIB. S.-E. Asia.

The form found in the Malay Peninsula is the typical plant described by Linnaeus and by Roxburgh as Galega purpurea. Mr. Ridley has noted on his Selangor specimens:—"Indigofera, introduced by Tamils, now established."

3. Tephrosia Hookeriana W. & A. Prodr. 212; var. amoena Prain. A slightly-branched erect herbaceous perennial with firm terete finely downy branches. Leaves short-petioled 4-8 in. long; leaflets terminal and in 6-9 opposite pairs narrowly oblanceolate, truncate, 1 in. long, green and glabrous above, grey and thinly silky beneath; stipules linear erect. Racenes copious all lateral, 6-9 in. long, lax-fld.; pedicels '1 in. long: bracteoles minute. Calyx densely silky '15-2 in. long: teeth setaceous rather longer than tube. Corolla '35-5 in. long, red, standard thinly silky. Pods 2-2.5 in. long, 8-10-seeded, slightly recurved, densely clothed with persistent brownish silky hairs; style flattened

glabrescent; stigma penicillate. Tephrosia amæna Wall. in Hort. Calcutt. not of Eckl.

PENANG; Curtis! MALACCA; Maingay! Derry! DISTRIB. N. India.

This differs from Wight and Arnott's T. Hookeriana (T. colutea Wight in Wall. Cat. 5647 not of Pers.) in having leaflets almost twice as long and glabrous above; in true T. Hookeriana the leaflets are pubescent above as well as beneath. As Hamilton in Trans. Linn. Soc. XIII, 546 gives the alternative name Tephrosia hirta to the Galega hirta cited under this species by Mr. Baker, it must follow, if Mr. Baker's identification be correct, that the name T. hirta Ham. should be cited for the species. Dr. Hamilton's diagnosis, however, is of a plant with "falcate" pods in "dense" racemes, two characters which exclude T. hirta from this species and which point to its being a form of T. villosa.

There is little doubt that in a critical review of the genus the Malayan and North Indian plant should be looked on as specifically distinct from the true *T. Hookeriana* of Southern India; but as an African *T. amæna* Eckl. has already been published, Dr. Wallich's MSS. name is not available. The species might, however, be known as *Tephrosia subamæna*. The *Tephrosia amæna* "Pers." cited by Mr. Baker does not exist.

## 26. MILLETTIA W. & A.

Trees, shrubs or large woody climbers with odd-pinnate, rarely-1-foliolate leaves; the leaflets opposite and usually large, generally stipellate. Flowers large and showy in axillary solitary or fascicled racemes and in terminal panicles, the florets single or in fascicles along the rachis. Calyx cup-shaped lobed or slightly toothed; teeth 5 or the 2 upper connate or absent. Corolla much exserted, petals long-clawed; standard broad spreading or reflexed, auricled or not at the base; wings free or only cohering at the tip, oblong sickle-shaped; keel incurved obtuse. Stamens monadelphous or diadelphous, the vexillary filament being united at the base or as far as the middle with the others, or being quite free; anthers uniform, filaments filiform. Ovary linear sessile or shortly stalked surrounded at base by an annular disc-like sheath; ovules rather numerous; style filiform incurved glabrous, stigma capitate. Pod linear, lanceolate or oblong, usually compressed and flat, occasionally turgid; thickly coriaceous or woody; late or hardly dehiscent. Species about 60; especially prevalent in Indo-China and Malaya.

The genus Millettia is retained here because its species are familiar to residents in the east under this name. But, as Baron von Mueller has shown, there is no room for a genus Millettia apart from Wistaria. The name Wistaria unfortunately, though it has come into common use among horticulturists, is not the one that was originally given to the genus. The oldest name, as pointed out by Dr O. Kuntze, is Phaseoloides and this, in a modified form, that author proposes to employ. Adjectives are not, however, advisable as generic names and the name Kraunhia which, as Sir Joseph Hooker and Mr. Jackson point out, is the earliest unobjectionable name, appears to be that which, when the two genera are united, must be employed for their species.

# Materials for a Flora of the Malayan Peninsula.

Inflorescences in axillary or terminal racemes or panicles;			
leaves scattered along the branches:-		**	
Standard not auricled at the base of the lamina (§ Eumil-			
lettia), or auricles only represented by callosities:—			
Leaves lustrous beneath with thin lepidote silky pubescence;	1.	M. sericea.	
(pods turgid silky; leaves exstipellate) Leaves opaque beneath, glabrous when mature, or silky	1.	11. 507 61 646.	
only on the nerves beneath (M. Hemsleyana); (pods			
woody):-			
Pods turgid rugose; leaves rigidly coriaceous; racemes			
densely thyrsoid; flowers dark-red or purple: (leaves			
without stipels):—			
Bracts large suborbicular, young racemes strobilate;			
standard silky externally; pods pubescent	2.	M. eriantha.	
Bracts small ovate early deciduous; standard glab-		•	
rous externally; pods glabrous	3.	M. atropurpure	α.
Pods flat smooth (lenticelled in M. glaucescens);			
leaves membranous (subcoriaceous in M. cærulea);			
racemes lax; flowers white, pink or blue:-			
Leaflets without stipels, membranous; racemes			
distinctly peduncled; pods glabrous (standard			
2-callose):—			
Standard glabrous externally:—			
Pods lenticelled, the sutures slightly winged;			
leaflets subglaucous quite glabrous beneath	4.	M. glaucescens.	
Pods not lenticelled the sutures thickened			
but not winged; leaflets pubescent on midrib		23	
and nerves beneath	5.	M. Hemsleyana	
Standard silky externally; (pods not lenticelled,			
sutures not winged; leaflets glabrous beneath)	6.	M. decipiens.	
Leaflets stipellate, subcoriaceous; racemes very			
close and short peduncled; pods pubescent exter- nally; (leaves glabrous beneath; flowers blue)	h-	W 1	
Standard auricled at base of lamina (§ Otosema); (leaves	7.	$M.$ c $\alpha$ rule $a$ .	
subcoriaceous opaque beneath, pods pubescent;:-			
Pods very wide turgid; leaflets small many obtuse;			
flowers pink, or white with pink tinge; panicles wide			
short:			
Lenflets densely velvety beneath; pod obpyriform,			
longitudinally channelled, pubescence short, pale-			
purple brown	8.	M. Maingayi.	
Leaflets glabrescent beneath; pod oval, not chanel-		and the state of t	
led, pubescence long, dark-brown	9.	M. oocarpa.	
Pods flat; leaflets large few caudate-acuminate;		F	
flowers pure white:—			
Leaflets 5-7, rarely 3; pods soft brown-velvety	10.	M. albiflora.	
Leaflets solitary; pods pale yellowish-velvety	11.	M. unifoliata.	
Flowers solitary along leagless stem on conical processes in			
axils of leaf-scars; leaves tufted at top of slender stems	12.	M. cauliflora.	

MILLETTIA SERICEA W. & A. Prodr. 263. A large woody climber 80-100 feet long, in dense forest; in the open a low spreading shrub 8-25 feet high; stems 3-6 in. diam.; branches striate shortly finely pubescent. Leaves 8-12 in. long, leaflets terminal and in 3-4 opposite petiolulate pairs, without stipels; obovate to elliptic-oblong, entire, apex bluntly cuspidate, base rounded or cuneate, 3-5 in. long 1.5-3 in. wide; coriaceous, deep-green and glabrous above glossy and silvery-grey or light-brown from a minute scale-like pubescence beneath: petiolules 2 in. long. Racemes axillary nearly as long as the leaves. slightly pubescent, the nodes not produced, each with the scars of 7-8 flowers. Flowers on pedicels 15 in long bracteolate under the calvx. Calya wide-tubular, limb truncate 15 in. deep, dark-brown silky externally. Corolla 5 in. diam., standard orbicular long-clawed, whitish pink or blue internally, brown-silky externally, wings clawed, purple or pink with white stripes. Vexillary filament hardly cohering at base with the remaining stamens. Ovary pubescent, style glabrous. Pod 3-7 in. long I in. across, densely brown-tomentose with a rusty shining velvety tomentum, turgid when ripe. Seeds 1-3, rarely 4, testa dark-brown smooth; 1 in. long, '75 in. diam. Miq. Flor. Ind. Bat. I, 153; Bak. in Flor. Brit. Ind. II, 104. Pongamia sericea Vent. Hort. Malmais. sub. t. 28; DC. Prodr. II, 416. Phaseolodes sericeum Kuntze Rev. I, 201.

VAR. typica; leaflets silvery beneath; sutures of young pods distinctly thickened; seeds 1-2, rarely 3.

PERAK; common; Scortechini! Kunstler! Wray! DISTRIB. Sumatra (Teysmann! Forbes 3103A!); Java (Kurz!)

A small-leaved form of M. sericea is reported from Penang (Curtis n. 844!); Lobb n. 310 in Herb. Kew, not seen by the writer, is noted by Mr. Hemsley as identical with it; and the same plant is also at Kew from Singapore, as it is at Calcutta from Perak (Kunstler n. 401! Wray n. 2364!). But the Perak specimens have in some cases leaflets of the ordinary size on the same twig with the small leaflets; the flowers of this form are exactly like those of M. sericea and the Penang plant is therefore not even separable as a variety.

VAR. malaccensis; leaflets brownish underneath; sutures of young pods hardly thickened; pods longer seeds 3-4.

Malacca; Griffith 1764! Maingay 518! Goodenough 1706!

A distinct local form but perhaps hardly a good variety.

2. MILLETTIA ERIANTHA Benth. Pl. Jungh. 250. A rather slender woody climber 50-80 feet long with only the youngest twigs silky. Leaves 8-11 in. long, rachis glabrous, leaflets terminal and in 2, rarely 3, opposite pairs, petiolulate without stipels; obovate-oblong or elliptic shortly cuspidate 2-4 in. long, 1·25-2·5 in across, rigidly coriaceous pale green and glabrous on both surfaces; petiolules 25 in. Rucemes copious, at first short dense 1-1·5 in. long and strobilate with large



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suborbicular cuspidate densely silky bracts, ultimately thyrsoid 6 in. long; the bracts deciduous 3 in. in diam.; pedicels 15 in. long. Calyx wide-campanulate 4 in. long, externally uniformly pubescent with brownish silky hairs; the teeth triangular two-thirds as long as tube. Corolla dark-red within, the standard externally densely glossy-brown silky nearly 1 in. long. Pod turgid, 3 in. long 1.75 in. across, 1-seeded; woody, rugose, clothed with pale brown hairs; slightly beaked. Miq. Flor. Ind. Bat. I, 155; Bak. in Flor. Brit. Ind. II, 108.

Perak; common, Wray! Scortechini! Kunstler! Malacca; very common, Griffith! Maingay! Derry! Goodenough! Singapore; Ridley 6396! 6663! Pahang; Ridley 2644!

3. MILLETTIA ATROPURPUREA Benth. Pl. Jungh. 249. An erect tree 30-80 feet high 3-4 feet in girth; branches and thick branchlets grey but glabrous. Leaves 15-18 in. long, leaflets terminal and in 3-4 opposite pairs petiolulate without stipels; narrow-oblong, base rounded or rarely cuneate apex obtuse or shortly cuspidate, 4-6 in. long 1.5-2 in. across, rigidly coriaceous green and glabrous on both surfaces, upper surface shining; petiolules 25 in. Racemes copious in a dense terminal thyrsoid hoary-tomentose panicle 6-8 in. across; bracts small ovate deciduous, 'l in. in diam.; pedicels 2 in. long, rusty-pubescent thickening in fruit. Calyx 25 in., campanulate, teeth small the two upper truncate the others acute, thinly silky externally. Corolla dark-purple, standard 1 in. long ovate-obtuse, glabrous externally. Vexillary stamen free; ovary pubescent. Pod turgid, 3 in. long 2 in. across, 1-2 seeded; woody subrugose quite glabrous; slightly beaked. Miq. Flor. Ind. Bat. I, 157; Bak. in Flor. Brit. Ind. II, 108. Pongamia atropurpurea Wall. Cat. 5910; Pl. As. Rar. I, t. 78.

Perak; Scortechini 193! 273! Kunstler 8012! Penang; Wallich 5910! Malacca; common. Singapore; Hullett 60! Distrib. Tenasserim; Sumatra.

4. MILLETTIA GLAUCESCENS Kurz in Journ. As. Soc. Beng. XLII, 2. 67. A large tree with glabrous branches the smaller ones slightly angled. Leaves 8-9 in. long; rachis glabrous; leaflets terminal and in 4-5 opposite petiolulate pairs; lowest pair broadly ovate the rest obovate-oblong all acuminate, 3.5-5 in. long 1.25-1.75 wide; membranous, bright green above glaucescent beneath, glabrous from an early stage on both surfaces; petiolules 2 in. Racemes axillary slender 6 in. long, at first puberulous as are the capillary solitary, paired, or fascicled pedicels, 2 in. long. Calyx wide shallow-tubular, slightly pubescent, obscurely toothed, 15 in. deep. Corolla 4 in. long, standard orbicular glabrous externally, 2-callose at base, steel-blue (fide Kurz); wings clawed. Vexillary filament cohering half way up staminal

sheath. Ovary pubescent style glabrous. Pod 5-6 in. long, 1 in. wide, thickish, woody, usually tubercled rarely reticulated on the faces, quite glabrous; both sutures thickened and expanded into narrow wings. Bak. in Flor. Brit. Ind. II, 107.

PERAK; Kapayong Kurta, Wray 168! Scortechini (specimens with reticulated but not tubercled pods)!

By its pods this species is most nearly allied to *M. tetraptera* Kurz, but it has very different leaves which resemble those of *M. pubinervis* and *M. Hemsleyana* except in being glabrous. It agrees with these two species also as regards structure of flowers though not as regards pods. As regards leaves it likewise much resembles *M. decipiens* and *M. dehiscens*; in these species, however, not only are the pods without wings along the thickened sutures but the standard is silky externally.

5. MILLETTIA HEMSLEYANA Prain. An erect bushy tree 20-40 ft. high, stem 10-15 in. in diam.; branches puberulous when young. Leaves 6-8 in. long, rachis pubescent, leaflets terminal and in 3-4 opposite petiolulate pairs, without stipels; lowest pair broadly ovate the rest elliptic-obovate all obtusely acuminate, 2-3.5 in. long, 1.25-1.5 in. wide; membranous bright green glabrous from an early stage above subglaucous and pubescent beneath with scattered flexuous spreading hairs which quickly disappear except from the midrib and main lateral nerves; petiolules 2 in., stipules large, 25 in., deciduous. Racemes axillary, slender simple, 2.5-4 in. long, at first puberulous as are the capillary, solitary or fascicled pedicels, '25 in. long, subtended by lanceolate deciduous bracts 2 in. long. Calya wide shallow-tubular, slightly pubescent, obscurely toothed, 15 in deep, red, or green with a reddish tinge. Corolla 4 in. long, standard orbicular 2-callose at base glabrous externally, white or faintly tinged with pink, wings clawed. Vexillary filament cohering nearly half way up staminal sheath. Ovary pubescent, style glabrous. Pod 3.5-4 in. long 5 in. wide, thin, quite glabrous, sutures slightly thickened not winged. Kraunhia Hemsleyana Prain MSS.

PERAK; Wray 3310! 3608!

Millettia Hemsleyana is very closely related to M. pubinervis Kurz, a Tenasserim species; it has however rather narrower leaflets and differs especially in having large stipules and bracts. To M. glaucescens it is also closely related, but it differs in having pods that are neither winged along the sutures nor lenticelled along the valves. Both in pods and in foliage it likewise closely resembles M. decipiens but that species differs in having a pubescent standard.

6. MILLETTIA DECIPIENS Prain. An erect wide-spreading tree 40-60 feet high, stems 2-3 feet in diam.; branches all glabrous the smaller slightly angled. Leaves 8-9 in. long; rachis glabrous; leaflets terminal and in 4-5 opposite petiolulate pairs; lowest pair broadly ovate the rest elliptic-obovate all acuminate 2-3.5 in. long 1.25-1.5 in. wide;

membranous rather dark green on both surfaces glabrous from an early stage on both surfaces except for occasionally a few scattered hairs on the midrib beneath; petiolules '2 in. Racemes axillary slender simple 6-8 in. long, at first puberulous as are the capillary solitary or fascicled pedicels, '2 in long. Calyx wide shallow-tubular, slightly pubescent, obscurely toothed, '15 in. deep. Corolla '4 in. long, standard orbicular, densely silky externally, 2-callose at base, pink, or white with a pink tinge, wings clawed. Vexillary filament cohering half way up staminal sheath. Ovary pubescent, style glabrous; ovules 4. Pod 4-5 in. long, nearly 1 in. across, glabrous, sutures not thickened. Kraunhia decipiens Prain MSS.

PERAK; Ulu Slim, 400 feet, Kunstler 10718! Kwala Dipong, Scortechini 1749! Pluss river, Wray 548! Pahang; Kwala Tahan, Ridley 2591!

The flowers of this species so much resemble those of *Pongamia glabra* that, with flowering examples, only careful dissection to ascertain the number of ovules satisfactorily distinguishes the two. Another species extremely nearly related to this is *Millettia dehiscens* (*Pongamia dehiscens* Koord. & Val. *Bijdr.* II. 96) a Java tree with the same silky standard, but with the ovary 5- or more-ovuled; its leaves are like those of *M. glaucescens*, its pods like those of *M. ovalifolia*.

7. MILLETTIA COERULEA Bak. in Flor. Brit. Ind. II, 107. A woody climber with glabrous branches. Leaflets terminal and in 3 petiolulate pairs, stipellate; obovate-oblong cuspidate 4-6 in. long; subcoriaceous, glabrous on both sides from an early stage; petiolules 15 in. long. Racenes short-peduceled, close, axillary. Flowers short-pedicelled, densely fascicled. Calyx campanulate 1 in., faintly silky, nearly truncate. Corolla three times the calyx, the standard densely white-canescent on the back. Stamens monadelphous. Pod large flat rather woody, linear-oblong 7-8 in. long, 1:5-1:75 in. wide, recurved, late in dehiscing, clothed with dense short persistent brown-velvety pubescence. Pongamia coerulea Grah. in Wall. Cat. 5894.

MALACCA; Griffith. DISTRIB. Burma.

The above description is taken from the Flora of British India, there being no specimen at Calentta either of the Burmese or of the Malacca types of Mr. Baker's species. The specimens here that accord best with the description are some from Penang (Curtis n. 2459); they are in fruit only and may prove to belong to M. coerulea. The plant is noted, however, as a "tree;" the specimens have 5-foliolate leaves and the leaflets resemble those of M. albiflora, of which it may equally well be a variety.

8. MILLETTIA MAINGAYI Bak, in Flor. Brit. Ind. II, 110. A creeper over 100 feet long; young branches pale brown-pubescent. Leaves 8-10 in. long, leaflets terminal and in 5-8 opposite pairs, shortly petioluled stipellate; oblong, base rounded, apex rounded or subacute, 15-2 in. long I in, across, corraceous, light green and glabrous above, velvety

underneath as is the leaf-rachis; petiolules 2 in., stipels setaceous, persistent. Racemes in small axillary panicles one-third as long as leaves, 2.5 in. long, 1.5 in. across; rachis and pedicels rusty-pubescent, as are the linear deciduous bracts 1 in. long; pedicels 1 in. Calyx 2 in. campanulate, externally rusty-pubescent, teeth wide-triangular half as long as tube. Corolla white tinged with pink, 5 in. long, standard orbicular, auriculate at base of lamina, slightly emarginate and slightly puberulous externally. Pod oblong or obpyriform, woody indehiscent (fide Baker), rounded at both ends, 6 in. long 3.5 in. wide, turgid, shortly pale rusty-brown velvety, the surface traversed by deep longitudinal grooves.

SINGAPORE; cultivated, Maingay; Ridley! SELANGORE; in dense jungle at 800-1200 feet elev., Kunstler 8759!

A remarkable species, originally described by Mr. Baker from a fruiting specimen. To the kindness of Mr. Ridley, the Calcutta Herbarium owes the possession of excellent flowering and fruiting examples of the plant; from these the above description has been drawn up. Mr. Kunstler's plant from Selangore is unfortunately only in flower; it agrees however in every detail with the flowering specimens sent from the Singapore garden by Mr. Ridley.

The only near ally of *M. Maingayi* is the next species from which it differs in having larger pods that, according to Mr. Baker, do not dehisce and in having leaflets densely tomentose beneath.

9. MILLETTIA OOCARPA Prain. A large creeper, young branches glabrous. Leaves 6-8 in. long, leaflets terminal and in 4-6 opposite pairs. shortly petiolulate stipellate; oblong, rounded at both ends, 2-3 in. long. 1-1.5 in. across, the terminal considerably exceeding the others, subcoriaceous light green and glabrous above, whitish and very sparsely adpressed-puberulous, finely reticulately veined beneath; leaf-rachis puberulous as are the petiolules 2 in, long; stipels setaceous persistent. Racemes in small axillary panicles one-half as long as leaves, 2.5 in. long. 1.5 in. across; rachis and pedicels slightly puberulous as are the linear deciduous bracts 'l in. long; pedicels 'l in. Calyx '2 in. long, campanulate, externally grey-puberulous, teeth short obscure. Gorolla white tinged with pink, 5 in. long, standard orbicular, auriculate at base of lamina, entire, uniformly sparsely puberulous externally. Stamens diadelphous, vexillary filament free. Ovary 2-ovuled, pubescent. Pod oval, woody, dehiscent, rounded at both ends, 3.5 in. long, 1.75 in. in diam., turgid, densely dark brown-velvety, the surface smooth. Kraunhia oocarpa Prain MSS.

PERAK; Batu Togoh, 250 feet, Wray 2141! Scortechini 429!

Very nearly related to Millettia Maingayi of which it has exactly the flowers. Its pods however are smaller, densely covered with darker and much longer hairs, and are distinctly dehiscent. In shape and size they resemble the egg of a domestic fowl. The leaflets too differ in not being velvety beneath, and the leaves are shorter.

0. MILLETTIA ALBIFLORA Prain. A handsome spreading tree some-

times 80-100 feet high (Kunstler), usually 30-50 feet, trunk 2-3 feet in diam., branches glabrous. Leaves a foot long, leaflets terminal and in 2-3 more rarely 1, opposite pairs, shortly petiolulate without stipels, ellipticlanceolate entire apex caudate base cuneate, 5-10 in. long, 1.5-2.5 in. across, lowest pair rather smaller, thickly membranous shining above dull beneath, with 6-9 pairs of ascending rather prominent lateral nerves and a very prominent midrib, quite glabrous on both surfaces, petiolules 2 in. long. Racemes in very long narrow axillary panicles towards ends of branches, 1-1.5 feet long, 2.5 in. across; individual racemes subfastigiate 4-6 in. long with 10-12 solitary short-pedicelled flowers; pedicels 15 in. long, rusty-puberulous as are the peduncles and main-rachis. Calyx 25 in. long, rusty-puberulous, tube campanulate rather longer than the triangular teeth, the two upper teeth connate emarginate. Corolla pure white '75 in. long, standard orbicular 2-auriculate at base of lamina, externally glabrous. Vexillary filament extending half way up the sheath or at length free on one side only, or on both. Ovary puberulous. Pod linear 7-13 in. long, 1:5-2 in. wide, straight flat rather woody, uniformly soft brown-velvety. Kraunhia albiflora Prain MSS.

Perak: Goping, Scortechini 1948! Ulu Salama, Kunstler 729! 1288! 4467! 5833! 5993! 6077! Larut, Kunstler 5357! 6709! 6842! Thaipeng, Wray 1864! Kota, Wray 1943! Ridley 7981! 8004! Pahang; Tahan, Ridley 2641!

A very fine species apparently extremely common in Perak. Mr. Kunstler notes that it is usually found near river-courses or in wet low ground.

11. MILLETTIA UNIFOLIATA Prain. A handsome spreading tree 30-40 feet high, trunk 1 foot in diam., branches glabrous. Leaves consisting of a solitary terminal leaflet, petiolulate without stipels, obovateoblong or lanceolate entire, apex acute rarely caudate, base cuneate, thickly membranous shining above dull beneath, with a prominent midrib and 6-9 pairs of ascending lateral nerves not much more prominent than the distinct secondary reticulations; glabrous on both surfaces; petiolule 25 in. long directly articulate with branch. Racemes in very slender axillary panicles shorter than the leaflets, 3-4 in. long 25-35 in. across; individual racemes short 3-5-fld. separated from each other by intervals 1 iu. long; peduncles and pedicles glabrous. Calyx 2 in. long, externally glabrous, campanulate 2-bracteolate at base, bracteoles ovate-lanceolate minute, teeth shorter than tube hirsute within. Corolla pure white :75 in. long, standard orbicular 2-auriculate at base of lamina, externally glabrous. Stamens monadelphous in a sheath split along the vexillary side. Ovary puberulous. Pod linear 6 in. long 1 in. across, flat, rather woody, tapering to both ends, finely pale yellowish-velvety externally. Kraunhia unifoliata Prain MSS.

Perak; Pangkore Island, Curtis 1615! Scortechini 1023! Tupia, Wray 2836! Blanja, Scortechini 124! 1711! Larut, Kunstler 4251! Goping, Kunstler 4492! 8210!

Very closely related to Millettia albiflora of which it has much the flowers and also much the fruits. It differs however from all other hitherto known Millettias in having 1-foliolate leaves. The pods are never so large as in M. albiflora and the inflorescence is very different in appearance owing to its being smaller and more slender.

12. MILLETTIA CAULIFLORA Prain. A small slender unbranched gregarious shrub 6-8 feet high, stems hardly '5 in. in diam., with black lenticelled bark, bearing a terminal tuft of leaves and having small nodular flower-bearing projections in the axils of leaf-scars along the stem. Leaves 1-1.5 feet long, stipules subulate, '3 in. long, caducous; rachis tawny-pubescent as are the petiolules and the setaceous persistent stipels; leaflets thinly membranous glabrous on both surfaces, lateral nerves in 5-7 ascending pairs impressed above very prominent like the midrib beneath; lowest pair 2 in. long 1.25 in. across, terminal and upper pairs 6 in. long 2 in. wide. Calya '2 in., glabrescent. Corolla (only withered specimens seen) apparently pink, standard apparently auricled. Pod solitary, at intervals along the stem, 3-3.5 in. long, '6 in. wide, narrowed towards base, slightly recurved, rigidly coriaceous early dehiscent, externally grey silky-tomentose; seeds 2. Kraunhia cauliflora Prain MSS.

PERAK; Larut, Kunstler 2555!

A very distinct species with leaves much like those of the African Millettia macrophylla Hook. f., but with fewer lateral nerves. It differs from all other known species in having solitary fruits (and apparently solitary flowers) in the axils of old leaf-scars along the stem. The standard seems to be auricled, but whether the stamens are monadelphous or diadelphous cannot yet be said.

#### 27. PONGAMIA Vent.

A tree. Leaves odd-pinnate, leaflets opposite, ex-stipellate. Flowers racemed. Calyx campanulate, nearly truncate. Corolla much exserted; standard broad, silky; keel obtuse the petals cohering at their tip. Stamens monadelphous, the upper filament free low down; anthers oblong, versatile. Ovary subsessile, 2-ovuled; style incurved, glabrous, stigma capitate. Pod woody, somewhat turgid, oblong, indehiscent, not winged nor thickened at the sutures. A single species, on all coasts from the Mascarene Islands to Malaya, North Australia, and Western Polynesia.

Pongamia Glabra Vent. Jard. Malm. t. 28. A fairly large tree 40-60 feet high, with spreading glabrous branches; bark greyish-green soft, wood pale-yellow when cut, darkening on exposure; stem reaching 2-3

feet in. diam. Leaves 8-10 in. long, pale-green, leaflets usually 5-7, more rarely 7-9, oblong or ovate, rarely ovate-lanceolate, acute, base cuneate or deltoid; subequal, 3-7 in. long, 1-3 5 in. wide, subcoriaceous, glabrous on both surfaces or, rarely, slightly puberulous on the nerves beneath, lateral nerves about 8 pairs rather prominent beneath as is the midrib, rachis about 5 in. long glabrous as are the petiolules 25 in. long. Flowers in rather short axillary racemes 4-6 in. long with peduncles 1-1.5 in. long, usually simple; nodes tumid bearing 2-4 subequal filiform pedicels, rachis and pedicels sparsely puberulous, pedicels 25-35 in. long, bracteolate at base and 2-bracteolate towards apex. Calyx widecampanulate 12 in. deep, 15 in. wide, mouth truncated. Corolla 35-5 in. long, white with violet or pinkish flush, standard orbicalar, silky on the back, subcordate and 2-auriculate at the base. Stamens monadelphous. Ovary finely pubescent, ovules 2, rarely 1. Pod turgid woody glabrous, 1.5-2 in. long, 8-1.25 in. wide, 25 in. thick, brownish-green with a short decurved point; seeds 1, very rarely 2, testa white, marbled with slightly raised brownish lines radiating irregularly from the hilum, ·7 in. long, ·5 in. wide.

Var. typica; leaflets usually 5, occasionally 7, oblong or ovate 2·5-3·5 in. wide, quite glabrous beneath; racemes always solitary simple, pedicels ·35 in. long, their bracteoles only sub-opposed and situated slightly above the middle. Pongamia glabra Vent.: DC. Prodr. II, 416; Wall. Cat. 5878; W. & A. Prodr. 262; Wight, Ic. t. 59; Bedd. Flor. Sylvat. t. 177; Miq. Flor. Ind. Bat. I, 147; Bak. in Flor. Brit. Ind. II, 240. Pongamia grandifolia Zoll. & Mor. Syst. Verzeichn. 3; Miq. Flor. Ind. Bat. I, 147. Pongamia mitis Kurz, Journ. As. Soc. Beng. XLV, 2. 128. Robinia mitis Linn. Sp. Pl. ed. II, 1044. Galedupa indica Lamk Encyc. Meth. II, 594 (excl. syn. Caju galedupa Rumph.); Roxb. Flor. Ind. III, 2:39. Dalbergia arborea Willd. Sp. Pl. III, 901. Galedupa arborea Roxb. Hort. Beng. 53.—Rheede Hort. Malab. VI, t. 3; Rumph. Herb. Amb. III, t. 117; Lamk III. t. 603.

In all the provinces, very abundant on the banks of every tidal river and along the margins of all Mangrove-swamps.—Distrib.; of the genus; often planted in inland districts.

Var. xerocarpa; leaflets 7-9, very rarely 5, lanceolate 1-1:35 in. wide, usually sparsely puberulous on the midrib and main veins beneath, racemes occasionally 2-3 in same axil and sometimes sparingly branched, the pedicels 25 in. long with the bracteoles opposed and situated close under the calyx; ovules sometimes solitary. Pongamia xerocarpa Hassk. Retz. ed. nov. 208. Malaparius flavus Miq. Flor. Ind. Bat. I, 1082 in addend., hardly Malaparius Rumphius.

PAHANG; Ridley 1362! KEDAH; Kunstler 1740! PERAK; Trang,

Kunstler 1420! 5625! MALACCA; Derry 939! DISTRIB. Ceylon (Thwaites C. P. 1489); Java; Sumatra.

Pongamia glabra is the well-known littoral species known in Southern India generally as Pangam, in Northern India as Karanj, in Burma as Thin-win and in Malaya as Malapari. Throughout India it is very generally planted, both as a timber tree, and for the sake of the oil obtained from its seeds; it does not seem to be planted in the Malayan provinces.

The typical variety appears in two somewhat distinct forms that pass, however, into each other by all kinds of intermediates. These are:—

(a) a form with medium-sized leaflets and flowers (the original P. glabra) which is spread throughout the area occupied by the species; also

(β) a form with decidedly larger leaflets and flowers (the form named P. grandifolia Zoll. & Mor.) which extends from north to south along the coasts of Chittagong, Arracan, the Andamans, Nicobars, Sumatra and Java, apparently without extending westward to the Sundribuns and India or eastward to Tenasserim and the Malay Peninsula.

VAR. xerocarpa, though only separable by characters that individually are trivial, nevertheless looks remarkably different from the type; it resembles far more the two species known as Millettia decipiens, and Millettia dehiscens. Indeed, with flowers alone, only a careful examination of the ovary, 4- or more-ovuled in the Millettias, 1- or 2-ovuled in the Pongamia, ensures accurate determination. The fruits of the Millettias are, however, dehiscent and therefore unlike those of Pongamia.

Roxburgh used for this genus Lamarck's name Galedupa, first applied in 1786. Lamarck's use of the name depended on his belief that Caju galedupa Rumphius (Herb. Amboin. II, t. 13) was this tree. As figured, however, Caju galedupa has equally-pinnate leaves, dehiscent pods and arillate seeds; Pongamia glabra has unequally-pinnate leaves, indehiscent pods, no arillus and a very small hilum. Moreover Rumphius describes and figures Pongamia glabra (Herb. Amboin. III, 117) under its Malay name Malapari. That Lamarck had detected his mistake is clear from his having abandoned the name Galedupa in 1797 (Illustr. t 603) in favour of Pungamia -taken from Adanson's name Pongam of 1768. This last Ventenat amended to Pongamia in 1803, and in that form has become familiar a name which, even were Galedupa accurately applicable, is much anterior to Galedupa. The point would not indeed call for discussion but for the fact that quite recently Taubert in the authoritative Natürlichen Pflanzenfamilien has re-adopted Roxburgh's usage. Kuntze, not satisfied even with this amount of change, desires to use the word Caju(m); that is, he desires to use precisely the synonym which cannot be applied to the plant described by Lamarck, as the name of the plant to which Lamarck's definition belongs.

Loureiro, overlooking both Rumphius' description of the pods and his figure showing its leaflets as opposite, referred Malaparius to Pterocarpus; he has been followed in this by most subsequent botanists except Miquel, who, having seen specimens of Malapari collected in Sumatra by Teysmann, removed the plant from Pterocarpus and established it as a genus. Bentham (Gen. Plant. I, 465) expresses a doubt as to Teysmann's Malapari being conspecific with Rumphius' one. Everything, however, is in favour of the belief (unfortunately the Sumatra plant is unrepresented in Herb. Calcutta) that Teysmann's 'Malapari' is Pongamia glabra, just as Rumphius' 'Malapari' and the 'Malapari' recently collected by Derry in Malacca, are Pongamia glabra. But it must be noted that while Rumphius' 'Malapari' appears

to be typical Pongmia glabra, Perry's 'Malapari' is VAR. zerocarpa, and so apparently, judging by Miquel's description, is Teysmann's.

## 28. Derris Lour.

Climbers, rarely erect trees. Leaves odd-pinnate, with usually exstipellate leaflets. Flowers copious, usually fascicled, showy, in axillary or terminal racemes or panicles. Calyx campanulate, nearly truncate. Corolla much exserted, standard broad; keel obtuse, the petals cohering slightly. Stamens usually monadelphous, the upper one free in § Aganope; anthers versatile. Ovary sessile, few-ovuled; style incurved, filiform, stigma capitate. Pod rigid, thin, flat, indebiscent, oblong if one-seeded, strap-shaped if few-seeded, with a distinct wing down the upper or both sutures. Distrib. Species about 40, belting the world in the tropics.

Standard not callose at the base :-Vexillary stamen free throughout; flowers single in ample thyrsoid panicles with nodes neither tumid nor produced into stalks (§ Aganope) :--Pod winged only along the upper suture, and sinuate between the seeds; corolla over 1 in. long ... 1. D. sinuata. Pod winged down both sutures, not sinuate between the seeds; corolla under 1 in. long :-Buds and flowers distinctly pedicelled, bracteoles shorter ... 2. D. Wallichii. than buds Buds and flowers subsessile, bracteoles exceeding the buds ... 3. D. thyrsiflora. Vexillary stamen united with the others at least in the centre of tube; flowers fascicled on tumid nodes that are sometimes produced into stalks:-Pods winged only along upper suture :-Pod narrow, pointed at both ends, several-seeded (§ Brachypterum ):-Climbers, leaflets 9-19 medium, acute; flowers in long lax panicles exceeding the leaves ... ... 4. D. scandens: Trees, leaflets 25-39 small, rounded; flowers in dense panicles shorter than the leaves ... 5. D. dalbergioides. \*Pod suborbicular or shortly broadly-oblong, obtuse, few-seeded (§ Euderris) :-Leaflets glabrous, not exceeding 5 in. long, exstipellate; pods glabrous ... 6. D. uliginosa, Leaflets pubescent beneath, often 6-8 in. long, stipellate; pods pubescent ... 7. D. elegans. Pod winged along both sutures [unknown in D. affinis and D. floribunda] (§ Dipteroderris) :-Rachis and branches of panicle densely silky; pod silky; (leaves faintly-veined) ... 8. D. andamanica.

Rachis and branches of panicle glabrous or sparsely puberulous; pod (where known) glabrous:—

Flowers white in laxly-branching panicles:—

Leaves with 10 pairs of prominent spreading secondary nerves; ovules 4 ... ... ... 9. D. affinis.

Leaves with 4-5 pairs of according to the secondary second

Leaves with 4-5 pairs of ascending faint secondary nerves; ovules 2-3 ... ... 10. D. floribunda. Flowers pink in fastigiately-branching panicles (leaves

with numerous spreading but not prominent secondary nerves; ovules 2; pod glabrous) ... 11. D. amæna.

Standard 2-callose at base (§ Paraderris):—
Leave and petals pubescent
Leaves and petals glabrous

... 12. D. elliptica.
... 13. D. malaccensis.

§ 1. AGANOPE. Robust climbers with large leaflets; flowers usually rather small in ample thyrsoid panieles, the nodes not produced into stalks; upper stamen quite free from the others down to the base; base of vexillum without callosities; pod winged down one or both sutures.

1. Derris sinuata Thwaites Enum. Pl. Zeylan. 93. A strong climber with dark-brown glabrous branches. Leaves 10-16 in. long; leaflets dark-green 5-7, coriaceous ovate- to ovate-oblong or elliptic, shortly cuspidate or subobtuse base rounded or widely deltoid, 4-5 in. long, 2-3 in. wide, glabrous on both surfaces, lateral nerves 5-7 pairs spreading hardly visible, rachis 6-12 in long glabrous as are the petiolules 25 in. long. Flowers in ample thyrsoid terminal, or terminal and axillary panicles 8-16 in. long, branches 1.5-3 in. long at intervals of ·5-1 in. their nodes not tumid nor produced into stalks, pedicels ·1 in. long (in fruit lengthening to 25-3 in.), stout, arranged usually in subopposite pairs 2-25 in. apart, occasionally all scattered, rachis and its branches glabrescent, pedicels adpressed rusty-puberulous, with small decidous bract at base and 2 very minute triangular deciduous bracteoles close to calyx. Calyx wide-campanulate thinly silky 2 in. long, with ripe fruit 25 in. in diam. circumscissile at base. Corolla 6 in., standard erect orbicular 5 in. wide, with ecallose cordate base. Stamens 2-adelphous, the vexillary filament free from the rest to the Ovary pubescent, ovules 5-7. Pod strap-shaped, coriaceous, distinctly reticulated, 2.5-8 in. long, 1.5 in. wide, upper suture narrowly winged, wing never exceeding 1 in. in breadth, usually much less and sometimes barely perceptible, always more or less sinuate between the 1-5 seeds. Benth. Journ. Linn. Soc. IV, Suppl. 113; Bak. in Flor. Brit. Ind. II, 246. Pongamia sinuata Wall. Cat. 5911. Pongamia grandifolia Grah. in Wall. Cat. 5882, not of Zoll. & Mor.

PERAK; on banks of tidal rivers, Kunstler 179! Scortechini! MALACCA; river banks, Griffith 1773! Maingay 551! DISTRIB. Ceylon; Sundribuns: Coasts of Indo-China and the Malay Archipelago.

2. Derris Wallichii Prain. A strong climber with glabrous brownish lenticular branches. Leaves 8-12 in. long, leaflets pale-green, 5-9, subcoriaceous oblong-lanceolate acute, base rounded, 4-5 in. long 1.5-2 in. wide, glabrous on both surfaces, lateral nerves ascending 8-9 pairs prominent beneath, rachis 4-8 in. long glabrous as are the petiolules 25 in. long. Flowers in ample thyrsoid terminal and axillary panicles 8-16 in. long, their branches 5-1.5 in. long at intervals of 25-5 in, their nodes not turned nor produced into stalks, pedicels 2-25 in. long arranged in subopposite pairs at intervals of 2-3 in., rachis and its branches thinly-silky as are the pedicels and calyx, bracts at base of pedicels ovate, much shorter than buds, lateral pair of bracteoles at their apices very minute. Calyx tubular at length campanulate, mouth truncate, 12 in. long, 15 in. wide. Corolla 3 in. long, standard erect orbicular with cordate ecallose base. Stamens 2-adelphous, the vexillary filament quite free. Ovary pubescent, ovules 4. Pod broadly strapshaped, thin, flat, glabrous, finely veined, 1.5-4.5 in. long, 1.5 in. wide 1-2-seeded, not sinuate between the seeds; distinctly winged down both margins. Pterocarpus floribundus Wall. Cat. 5846. Derris thyrsiflora Prain MSS. in Herb. Calcutta (as to Andamans specimens) hardly of Bentham.

Andamans; King's Collectors! DISTRIB. Silhet, Cachar and Khasia.

The Andaman specimens here described have leaves very like those of D. thyrsiflora but they have rather more nerves and are not quite so thick. The long pedicels, however, make it very easy to distinguish the two, while the fruits of D. Wallichii are bronder than those of D. thyrsiflora. In distributing specimens from the Calcutta Herbarium those from the Andamans were unfortunately issued under the name D. thyrsiflora.

3. Deeris Thyrsiflora Benth. in Journ. Linn. Soc. IV, Suppl. 114. A large rambling bush or small tree with spreading branches, 15 to 20 feet high, or a robust climber reaching 60-80 feet in length, in either case with a stem 6-8 in. in diam. with glabrous lenticelled branches. Leaves 8-15 in. long, leaflets dark-green, 5-9, coriaceous oblong to oblonglanceolate usually acute sometimes rounded at apex, base rounded or cuneate, 4-6 in. long, 1.5-2.5 in. wide, glabrous on both surfaces, lateral nerves ascending 5-7 pairs rather prominent beneath, rachis 4-10 in. long, glabrous as are the petiolules '25 in. long. Flowers in ample thyrsoid terminal and axillary panicles 8-24 in. long, their branches 5-2 in. long at intervals of 25-5 in., their nodes not tumid nor produced into stalks, pedicels in fruit under 'I in. in flower hardly perceptible, arranged usually in close-set subopposite pairs, rachis and its branches thinly silky as is the subsessile calyx with linear deciduous basal bracteole as long as bud and with two very minute lateral bracteoles. Calyx tubular, at length campanulate, mouth truncate, 12 in. long, 15 in. wide, greenish white. Corolla white, '3 in. long, standard erect orbicular '35 in. wide, with ecallose cordate base. Stamens 2-adelphous, the vexillary filament free from the rest to the base, the free portion of all the filaments slightly puberulous. Ovary pubescent; ovules 4. Pod strap-shaped, thin, flat, glabrous finely-veined, 1.5-3.5 in. long, 1-1.25 in. wide, distinctly winged along both sutures, wings subequal '2-25 in. wide, not sinuate between the 1-3 (very rarely 4) seeds. Bak. in Flor. Brit. Ind. II, 246 (excl. syn. Amerimum obovatum and Pongamia Wall. Cat. 9054). Derris pyrrothyrsa Miq. Flor. Ind. Bat. Suppl. 297. Aganope floribunda Miq. Flor. Ind. Bat. I, 151. Millettia thyrsiflora Benth. Pl. Jungh. 249.

NICOBARS; Kamorta, Kurz! KEDAH; Yau, Ridley 5224! PENANG; Curtis 248! MALACCA; Griffith 1776! Maingay 552! Derry 94! 1030! PERAK; Scortechini, 907! 1176! 1342! 1533! 1639! 2073! Wray, 1985! 2513! 2770! 3068! Kunstler 3630! 6419! 7638! 7757! 7919! 10062! 10395! 10850! PAHANG; Ridley 2456! 2458! SINGAPORE; Anderson! Kurz! Hullett! DISTRIB. Sumatra, Java.

This species is very distinct from *D. sinuata* by reason of its much smaller, more numerous, and more closely set florets, which are as nearly as possible sessile; also on account of its very different pods which are shorter, much thinner, not sinuate between the seeds and are distinctly winged down both sutures. It is much more closely related to the last species from which it can be most easily distinguished by the absence of pedicels.

The synonym Amerimum obovatum is excluded because that plant is the same as Pongamia obovata Grah., reduced, with justice, to Derris cuneifolia. And the synonym Pongamia Wall. Cat. 9054 is also excluded, at least as a temporary measure, because Mr. Baker, in another passage, has referred it to Spatholobus acuminatus.

There are at Calcutta authentic examples, named by Dr. Miquel himself, both of Aganope floribunda Miq. and of Derris pyrrothyrsa Miq.; these are specimens of the same species, from Java and Sumatra respectively; they agree exactly with our specimens from the Malay Peninsula.

The variation in habit depends on whether the species is growing in open places or in dense forest.

- § 2. Brachypterum. Trees or climbers with comparatively small leaflets; flowers medium fasciculate on tumid nodes in axillary panicles: stamens monadelphous; base of vexillum without callosities; pod thin strap-shaped, narrow, pointed at both ends, winged only along the upper suture.
- 4. Derris scandens Benth. in. Journ. Linn. Soc. IV, Suppl. 103. A very large climber often exceeding 100 feet in length with branchlets at first obscurely grey downy; stems as thick as a man's wrist with very irregularly excentric annual rings. Leaves 4-6 in. long, dark green; leaflets 9-19, rigidly subcoriaceous obovate-oblong to oblong, acute rarely obtuse at apex, cuneate less often rounded at base, 2 in long, 75 in. wide, polished and glabrous above, obscurely adpressed

grey-pubescent, dull beneath; rachis 2.5-4 in. long, grooved above, glabrous as are the petiolules 2 in. long. Flowers in very long copious short-peduncled axillary racemes, sometimes 15-18 in. in length, with distant tumid nodes sometimes produced into short branches each bearing a cluster of unequal slender pedicels 15-25 in. long, the various flowers from one node expanding successively, rachis and pedicels finely adpressed-pubescent, the pedicels 2-bracteolate under the calyx, the bracteoles ovate minute. Calyx 12 in. long, thinly silky, wide-campanulate, teeth obscure. Corolla white to pale-rose, 35 in. long. Stamens monadelphous. Ovary finely puberulous; ovules 6-8. Pod 1-3 in. long, 4-5 in. wide, narrowed to both ends, narrowly winged along the upper suture, 1-4 seeded, uniformly finely adpressed grey-silky, somewhat turgid against the seeds. Bak. in Flor. Brit. Ind. II, 240. Dulbergia scandens Roxb. Cor. Pl. II, t. 192; DC. Prodr. II, 417; Wall. Cat. 5857; Roxb. Flor. Ind. III, 232; W. & A. Prodr. 264; Wight, Ic. t, 275. Dulbergia timorensis DC. Prodr. II, 417. Pongamia coriacea Grah. in Wall. Cat. 5905. Brachypterum scandens Benth. in Ann. Wien. Mus. II, 101; Miq. Flor. Ind. Bat. I, 138. Brachypterum timorense Benth. in Mig. Pl. Jungh. 253; Mig. Flor. Ind. Bat. I, 138.

Andamans; very common everywhere. Nicobars: plentiful. Penang; Curtis 979! Pahang: Ridley 2639! Distrib. South-Eastern Asia to North Australia, general.

Mr. Baker has described the pod as glabrous; it never becomes quite glabrous even when ripe. Though the name Derris scandens is most generally used for this species, it has to be pointed out that, so soon as Deguelia is recognised to be the best generic name, this species will have to be known as Deguelia timorensis Taub. (Natür. Pflanzenfam. III, 3. 345) because Deguelia scandens is the original name for the American plant at present known as Derris guianensis Bth. The genus was published under the name Deguelia before it was published under the name Degreis.

5. Derris dalbergiodes Bak. in Flor. Brit. Ind. II, 241. A spreading tree 30-40 feet high; branchlets silky-pubescent. Leaves 6-8 in. long by 1.5-2 in. wide, leaflets 25-39, linear rounded-obtuse at both ends slightly oblique at the base the apex slightly emarginate, 1 in. long, 35 in. wide, firmly papery, adpressed pubescent on both sides, darkgreen above paler beneath, lateral nerves 7-8 pairs, indistinct, rachis 5-6 in. long and petiolules 1-15 in. rusty-pubescent. Flowers in copious short-peduncled axillary racemes 3-6 in. long very rarely exceeding the leaves, about 65-75 in. wide with crowded tumid nodes each bearing a dense cluster of unequal short pedicels 1 in. long or less, the various florets of a node expanding successively, rachis and pedicels brown silky-pubescent, the pedicels 2-bracteolate under the calyx, the bracteoles linear '08 in. long. Calyx '15 in. long, densely brown-silky, shortly but distinctly toothed, the teeth deltoid the lower subequal, the

two upper somewhat united. Corolla rose-purple, 45 in. long, standard oblong, base cordate 2-glandular. Stamens monadelphous. Ovary densely pubescent, ovules 5-8. Pod 1-5-seeded narrowed to both ends 1-2.5 in. long, winged along the upper suture.

PERAK; very common, Scortechini 1995! Ridley 3024! Kunstler 3039! 5805! PATANI; Machado 5812! MALACCA; Maingay 603! Derry, 138! 488! Goodenough 1829! DISTRIB. Tenasserim and Martaban.

None of the large suites of specimens sent to Calcutta has fruit; Mr. Baker describes the pod as exactly like that of D. robusta; he however describes D. robusta as having a glabrous pod which is never the case. Further Mr. Baker has described the leaflets of this species as 'glabrous' and on this account Father Scortechini has proposed for the Perak plant the name D. dalbergioides VAR. dasyphylla, to be distinguished by its pubescent leaflets from Mr. Baker's plant. The leaves of the original specimens collected by Parish and Maingay have, however, leaflets pubescent on both surfaces exactly as in the Perak plant.

- § 3. EUDERRIS. Robust climbers with medium to large leaflets; flowers rather large fasciculate on tumid or produced nodes in axillary panicles; stamens monadelphous; base of vexillum without callosities; pod thin, broadly oblong or suborbicular, obtuse, winged only along the upper suture.
- 6. Derris uliginosa Benth. Pl. Jungh. 252. A widely spreading shrubby climber sometimes 40 feet long, with glabrous branches; stems 2-3 in. in diam. Leaves 5-8 in. long, leaflets usually 5, but very often 3, casually solitary, the terminal exceeding the others, rigidly subcoriaceous. ovate, acuminate or caudate-acuminate, base always rounded, 3-5 in. long, 1.5-2.5 in. wide, polished above quite glabrous on both surfaces, lateral nerves 7-8 pairs, very faint, looping at their ends some way within margin, bright green above paler beneath, rachis 2-5 in. long, channelled above and glabrous as are the petiolules 25 in. long, secondary nerves indistinct. Flowers in rather short showy axillary racemes, 3-5 in. long, with nodes produced into short stalks each bearing one or several subequal pedicels the flowers of a fascicle opening subsimultaneously, rachis and pedicels glabrous, the node-stalks 15 in., the pedicels proper as long, bracteolate at base and again 2-bracteolate a little below the calyx. Calyx '15 in. long, subglabrous except the shortly ciliate subtruncate margin, rather wide-campanulate. Corolla delicate rose-pink, 4 in. long, standard orbicular base subcordate eglandular. Stamens monadelphous. Ovary finely puberulous, ovules 5-7. Pod obliquely rounded-oblong 1-5 in. long, 1.75 in. across, glabrous, pale straw-colour when ripe, thin, flat, distinctly reticulately-veined; seed solitary, yellowish-brown, much compressed, I in. long almost as broad. Benth. in Journ. Linn. Soc. IV, Suppl. 107; Miq. Flor. Ind. Bat. I, 141; Bak. in Flor. Brit. Ind. II, 241. Robinia uliginosa Roxb.

ex Willd. Sp. Pl. III, 1133. Galedupa uliginosa Roxb. Hort. Beng. 53; Fl. Ind. III, 243. Pongamia uliginosa DC. Prodr. II, 416; Wall. Cat. 5879 (excl. E.); W. & A. Prodr. 262. Pterocarpus uliginosus Roxb. ex G. Don. Gen. Syst. II, 377.

In all the provinces, on the sea-coasts and on muddy tidal-river banks, common. DISTRIB. Sea-shores from Eastern Africa and the Mascarene Islands to Malaya and Western Polynesia.

Mr. Bentham would refer here Derris Forsteniana Bl. (Miq. Flor. Ind. Bat. I, 144); this hardly seems probable owing to Miquel's description of the leaves as having 3 pairs of leaflets. Mr. Baker would also refer here Dalbergia heterophylla Willd. (Sp. Pl. III, 901). but this again is very improbable for D. heterophylla has, according to the original description, obtuse leaves, which Derris uliginosa never has; as, also, racemes longer than the leaves, which those of D. uliginosa never are.

7. Derris Elegans Benth. Pl. Jungh. I, 252. A rather slender creeper sometimes 60 feet long, with brown pubescent branchlets. Leaves 8-12 in. long, dark-green, leaflets 5 (very rarely 3 or 7) the terminal exceeding the others, rigidly subcoriaceous, from oblong to lanceolate, base always somewhat rounded, 3-8 in. long, 1.5-4 in. wide, glabrous above, when young rusty-pubescent (sometimes persistently so) beneath, rachis rusty-pubescent 4 in. long, petiolules glabrescent 2 in. long with rigid subulate stipels 1 in. long, lateral veins 6-8 pairs prominent like midrib beneath. Flowers in solitary or fascicled axillary racemes 2-3 in. long, always much shorter than the leaves, nodes bracteate tumid but not produced into stalks, each bearing one or several subequal pedicels, rachis and pedicels rather densely villous with spreading rusty pubescence, the pedicels filiform 35 in. long with 2 linear bracteoles a little below the calyx. Calyx 15 in. long, black purple. sparsely pubescent, margin subtruncate. Corolla pure-white with pink tips, 4-5 in. long, standard orbicular-oblong tapering at base eglandular. Stamens monadelphous. Ovary softly villous, ovules 2-4. Pod obliquely rounded-oblong or oblong 1.5 (rarely 2.5 in.) long, 1 in. wide, thin, flat, distinctly reticulated, covered throughout with a fine sparse pubescence; seeds 1, rarely 2, much compressed '75 in. in diam.

Van. typica; leaflets ovate to lanceolate, acute, becoming at length subglabrous beneath, flowers 5 in long. Derris elegans Benth. Pl. Jungh. I, 252; Journ. Linn. Soc. IV, Suppl. 109; Bak. in Flor. Brit, Ind. II, 242. Pongamia elegans Grah. in Wall. Cat. 5883. Pongamia floribunda Grah. in Wall. Cat. 5884. Leguminosa Wall. Cat. 7540.

Andamans; King's Collectors! Perak; Kunstler 1419! 3911! DISTRIB. Tenasserim and Martaban; Sumatra (Forbes!)

VAR. vestita; leaflets oblong-acuminate to ovate-acute, densely persistently rusty-velvety beneath, flowers rather smaller 4 in. long. D. vestita Bak. in Flor. Brit. Ind. II, 242.

Malacca; Maingay 608! Perak; Scortechini 1758! Kunstler 2775! 4014! 5583! 7398! Distrib.; Tenasserim.

The only differences between the two plants are in the points noted; their fruits are identical. The species is evidently closely related to D. uliginosa and has very similar pods; these however are always rather narrower in proportion to their length and further differ in occasionally being 2-seeded. But the inflorescence differs in the two in that the nodes of D. elegans are not produced; and the leaves differ markedly from those of D. uliginosa in shape, and as to pubescence. The most striking peculiarity of D. elegans is however the presence of stipels, a feature most unusual in Derris, but equally manifest in both varieties.

- § 4. DIPTERODERRIS. Robust climbers with large leaflets, flowers medium on tumid or produced nodes in terminal and axillary panicles; stamens monadelphous, base of vexillum without callosities; pod winged down both sutures.
- 8. Derris andamanica Prain. A strong climber with fulvous or tawny-pubescent branches. Leaves 10-16 in. long; leaflets pale-green 7-9 (rarely 5) coriaceous, oblong or elliptic shortly cuspidate, base rounded, 5-6 in long 2-3 in wide, glabrous on both surfaces, lateral nerves 8-10 pairs spreading faint below not visible above except in voung leaves, secondary veining fine, rachis 6-12 in long glabrous as are the petiolules 25 in. Flowers in ample terminal and axillary panicles, the branches rather numerous ascending 5-8 in. long, nodes tumid or produced into short stalks sometimes 75-1 in. long, bearing several unequal filiform pedicels either clustered at their tips or scattered throughout their extent, rachis and branches pale tawny-pubescent, pedicels puberulous 2-3 in. long exceeding the calyx, bracteate at their base and 2-bracteolate under the calyx. Calyx wide-campanulate 12 in. long, densely silky, green, margin subentire. Corolla white '6 in. long, standard orbicular, base ecallose shallow-cordate. Stamens monadelphous. Ovary finely pubescent; ovules 4. Pod finely tawny-silky, thin, strap-shaped, 3-4 in. long, I in. wide, winged subequally along both sutures, wings 12 in. wide; seeds 1-3. Derris sinuata Prain in Journ. As. Soc. Beng. LX, 2, 311 not of Benth.

Andamans; from Coco Group southwards; common on the coasts. NICOBARS; common.

This fine species has not, so far, been collected outside the limits of the Andamans and Nicobars. Originally referred in the Calcutta Herbarium to *Derris sinuata*, recent and fuller suites of specimens now show that its nearest alliance is with the South Indian *D. eualata* Bedd., but it has longer pedicels and smaller bracteoles than has that species, and has a silky pod.

9. Derris affinis Benth. Pl. Jungh. 252. A climber with palebrown lenticular glabrous branches. *Leaves* 6 in. long, pale-green, leaflets 5 subequal, firmly chartaceous, ovate-acute base rounded, 2.5 in.

long, 1.25 in. wide, glabrous on both surfaces, lateral nerves 10 pairs prominent on both sides running almost to margin of blade, rachis 3.5 in., glabrous as are the petiolules '2 in. long. Flowers in lax axillary panicles 6-8 in. long, sparingly branched, branches 2.5 in. long or less, spreading, nodes tumid but not produced into stalks, bearing one or more unequal filiform pedicels, rachis and pedicels sparsely adpressed-puberulous, the pedicels '2 in. long rather longer than the calyx, bracteate at their base, 2-bracteolate close under the calyx. Calyx campanulate '12 in. long, subglabrous, purplish, margin sinuate-toothed, Corolla apparently white, '35 in. long, standard orbicular ecallose. Stamens monadelphous. Orary sparsely hairy; ovules about 4. Derris uliginosa VAR. Loureirii Benth. in Journ. Linn. Soc. IV, Suppl. 108 in part. Pongamia nliginosa Wall. Cat. 5879 (E only) not of DC.

Penang; Wallich!

Nearly related to *D. marginata* Bth. from which it differs mainly in having shorter pedierls 2-bracteolate close under the calyx, and in having rather smaller leaflets with more numerous nerves. It seems also very nearly related to the next species from which it differs in its shorter panicles and its leaflets with more numerous and more prominent nerves. It is besides nearly related to *D. amana* but differs in having thinner leaves, and laxer panicles with spreading not fastigiate branches.

10. Derris floribunda Benth. Journ. Linn. Soc. IV, Suppl. 105. A stout rambling shrub with glabrous whitish branches. Leaves 4-5 in. long, leaflets 3-5, pale-green, thinly coriaceous, broadly elliptic-oblong, base rounded, apex shortly and obtusely acuminate, 2-2.5 in. long 1-1.5 in. wide. glabrous on both surfaces, lateral nerves 4 pairs very faint beneath not visible above, rachis 3-4 in. long, glabrous as are the petiolules 25 in. long. Flowers in long lax axillary panicles sometimes 15-18 in. long, sparingly branched, the branches 4-6 in. long, spreading, nodes distant tumid, sometimes produced into stalks bearing 2-6 unequal filiform pedicels, rachis and pedicels sparsely spreading-puberulous, the pedicels 4 in. long, 2-bracteolate at base of calyx. Calyx campanulate 12 in. long, purple-brown, margin crenate. Corolla white, 3 in. long, standard orbicular ecallose with a green spot above the long claw. Stances monadelphous. Ovary sparsely puberulous, ovules 2-3. Brachypterum phoribundum Miq. Flor. Ind. Bat. I, 139.

Perak; Larut, Scortechini 2180! Distrib. Java.

The Perak specimens have pedicels rather more glabrous than the Java ones; otherwise they agree very closely. Miquel refers the plant doubtfully to Brachupterum; to the writer it seems as if its affinities were rather with Dipteroderris; unfortunately the pod is still unknown. The Perak plant is 2-ovuled, the Java one 3-ovuled, in all the flowers examined by the writer.

11. Deeris amena Benth. Pl. Jungh. 252. A large glabrous climber reaching 50 feet, with black branches. Leaves 6-8 in. long,

leaflets bright-green, 7 (sometimes 9, rarely 5), rigidly subcoriaceous to coriaceous, ovate-oblong cuspidate, base rounded to cuneate, 2-4 in. long, 1-2 in. wide, glabrous on both surfaces, lateral nerves numerous parallel spreading indistinct beneath visible above, rachis 4-6 in., glabrous as are the petiolules 25 in. long. Flowers in rather dense. fastigiately branched, axillary panicles 6-9 in long, lower branches almost equalling main-rachis, nodes rather close often produced in short stalks bearing usually 3 unequal filiform pedicels, rachis and pedicels glabrous, the pedicels 25 in. long, 2-bracteolate a short distance below calyx. Calyx campanulate 12 in., glabrescent, mouth sinuately-toothed. Corolla pink (Ridley) or purple (Kunstler), 3 in. long, standard orbicular ecallose. Stamens monadelphous. Ovary sparsely puberulous; ovules usually 2. Pod thin glabrous ligulate-oblong flexible finely veined, 3-4 in. long, 1-1.5 in. wide, upper wing .25 in. wide, lower narrow; seeds usually 2, sometimes solitary.

VAR. typica; leaves rigidly subcoriaceous green beneath. D. amena Benth. Journ. Linn. Soc. IV, Suppl. 110; Bak. in Flor. Brit. Ind. II. 245. Pongamia amæna Wall. Cat. 5912.

Perak; Kunstler 1381! Scortechini 1736! Malacca; Maingay! DISTRIB. Tenasserim.

VAR. Maingayana; leaves coriaceous glaucous beneath. Derris Maingayana Bak. in Flor. Brit. Ind. II, 245.

Malacca; Derry! Singapore; Maingay! Hullett! Ridley 6402!

It seems impossible, now that large suites of specimens have been sent from Malacca by Mr. Derry, to treat these two plants as more than varieties of one species. Mr. Derry gives two local names for his plant, 'Aker-tuba-tuba' and 'Aker-pakidah.'

- § 5. Paraderris. Robust climbers with large leaflets, flowers large on usually produced nodes in axillary panicles; stamens monadelphous; base of vexillum with two callosities extending along the claw; pod winged down the upper suture.
- 12. Derris Elliptica Benth. Journ. Linu. Soc. IV, Suppl. 111. large climbing shrub 20-30 feet long with black warted branches and rusty-pubescent young shoots. Leaves 9-15 in. long, dull greyish-green, leaflets 9-13 subequal, at first membranous, with age subcoriaceous, oblong to oblanceolate-oblong cuspidate, 3-6 in. long, 1-1.3 in. wide, pubescent beneath, at first puberulous at length glabrous above, rachis 6-9 in. long, rusty-pubescent faintly grooved above, petiolules 2 in. long rusty-pubescent, lateral veins 8-10 pairs prominent beneath as is the midrib. Flowers in copious lax axillary racemes 9-10 in. long, never exceeding the leaves, nodes produced into distinct stalks 3-1.3 in. long, each bearing one or more (usually 3) subequal pedicels, rachis and

pedicels densely rusty-tomentose the pedicels slender 25 in. long, bracteolate at their bases and 2-bracteolate under the calyx. Calyx 25 in., densely rusty-pubescent, wide-campanulate the mouth sinuately subtruncate. Corolla from pure white (Scortechini) to white with pink tinge (Kunstler) or dull pink (Wray), 65 in. long, standard densely silky on the back, orbicular with rounded 2-callose base. Stamens monadelphous. Ovary villous, ovules usually 4 (sometimes 3, rarely 5). Pod oblong to lanceolate, 1-4-seeded, 1.5-3.5 in. long, 75 in. wide, distinctly winged along upper, faintly along lower suture. Bak. in Flor. Brit. Ind. III, 243. Galedupa elliptica Roxb. Hort. Beng. 53; Flor. Ind. III, 242. Pongamia elliptica Wall. Pl. As. Rar. III, 20, t. 237; Cat. 5881; Wight, Ic. t. 420; Miq. Flor. Ind. Bat. I, 148. Pongamia dubia Grah. in Wall. Cat. 5899. Pongamia volubilis Zoll. & Mor. Syst. Verzeichn. 3; Miq. Flor. Ind. Bat. I, 148. Millettia pachycarpa Bak. in Flor. Brit. Ind. II, 106 in part (as to the Malacca locality).

MALACCA; Griffith! Maingay! PERAK; Scortechini 1738! Wray 1678! 1695! 3323! Kunstler 1431! Distrib. Northwards through Tenasserim to Chittagong; southwards through Sumatra to Java.

Mr. Wray gives 'Aker-tuba' as the Malay name of this species. It has a true Derris pod but differs markedly from the other species by its standard silky on the outside. When they are only in flower and the leaves of both are still young it is very difficult without careful examination to distinguish this species from Millettia pachycarpa. This is Zollinger's Pongamia volubilis of which there are authentic specimens at Calcutta; it is also said by Mr. Bentham to be the same as P. Horsfieldii Miq. and P. hypoleuca Miq.; neither of these is represented in Herb. Calcutta.

13. Derris Malaccensis Prain. A rather slender creeper 30-50 feet long with glabrous branches. Leaves 9-15 in. long, bright-green, leaflets 5-7 (rarely 9), subequal, subcoriaceous, elliptic, base rounded apex caudate-acuminate, 4-6 in. long 2-2.5 in. wide, the caudate tip 35-6 in. long, glabrous on both surfaces, rachis 6-8 in. long, glabrous hardly grooved above, petiolules 25 in. glabrous, lateral veins about 5 pairs indistinct. Flowers in solitary axillary racemes 4-6 in. long always much shorter than the leaves, nodes produced in stalks 15-2 in. long each bearing one or several subequal pedicels, rachis and pedicels glabrescent, the pedicels filiform 25 in. long bracteolate at base and with 2 small lanceolate bracteoles very near base of calyx. Calyx: 15 in long reddish, wide-campanulate, glabrous except the ciliate slightly sinuate margin. Corolla white or yellow tinged with pink, 65 in. long, standard orbicular truncate or subcordate at the 2-callose base. Stamens monadelphous. Ovary densely rusty-pubescent; ovules 4-5. Pod oblong winged or not, glabrous, 1-4-seeded, 2-3 in. long.

VAR. typica; pod 1.5 in. wide, winged along the upper suture, sometimes along both. Derris cuneifolia VAR. malaccensis Benth. Journ. Linn. Soc. 1V, Suppl. 112.

PEKAK; Larut, Goping, etc. Kunstler 4028! 4149! 4504! 8551! Scortechini 110! Malacca; Griffith 1774! SINGAPORE; Ridley! DISTRIB. Tenasserim; Borneo.

VAR.? aptera; pod 1 in. wide, wingless; leaflets with lateral veins stronger beneath.

MALACCA; Maingay 613! PERAK; Kunstler 4518! 6428!

VAR.? millettioides; pod and leaflets as in vAR.? aptera but the former usually longer and ultimately dehiscing (as in Millettia) along both sutures.

PERAK; Ulu Bubong, Kunstler 10696!

The plant here described as Derris malaccensis is extremely closely related to D. cuneifolia of which indeed it was treated by Mr. Bentham as a variety. Its leaves differ mainly in having fewer but larger leaflets with long caudate-acuminate tips; the flowers, too, are considerably larger and of a somewhat different colour: the pods of D. malaccensis are also much larger than those of D. cuneifolia. It must also, from the description of that plant, be very nearly allied to D. montana Benth. (Pl. Jungh. 253) a Java species not represented in Herb. Calcutta. The foliage of the two is evidently almost identical but the flowers are a little larger in D. montana, being '75 in. long. D. malaccensis is thus evidently intermediate between D. cuneifolia and D. montana as regards its petals; it is likewise intermediate as regards ovary. Mr. Bentham ascribes two ovules to D. cuncifolia and this is almost always the case; in one or two flowers, however, three ovules have been found; Mr. Baker indeed says that the pod of D. cuneifolia may be 3-seeded,-this no Calcutta specimen shows. To D. montana Mr. Bentham ascribes "about 8 ovules;" D. malaccensis has had, in almost every flower examined, 4 ovules and in some pods it has 4 seeds; one or two ovaries with 5 ovules have been met with, but never more than 5 have been seen.

The plants named var.? aptera and var.? milletticides are placed here merely for convenience of reference. They are both reported in fruit only, and as they have almost exactly the leaves of Derris malaccensis it seems better for the present to refer to them under that species. As regards var.? aptera indeed this is the more essential since two gatherings from Perak (Wray 2025! Kunstler 3190!), and one from Penang (Curtis 2735!) have pods intermediate between those of var.? aptera and those of D. malaccensis. The pods of var.? aptera are, however, obviously those of a Pongamia rather than those of a Derris, if Pongamia be really entitled to a separate generic position, which the writer hardly believes. The distinguishing character is a quite artificial and, as these very plants show, a somewhat inadequate one.

The existence of var.? millettioides raises an even more troublesome question, the relationship of Millettia to Derris. The arrangement adopted in the Genera Plantarum, the Histoire des Plantes and the Natürlichen Pflanzenfamilien places Derris and Pongamin among the Dalbergiew and Millettia among the Galegew. This then, considering the great authority of the authors who have sanctioned it, must be accepted as the most natural arrangement possible. That a more inconvenient one could hardly be devised has, however, been the experience of most field botanists and of most authors who have had to deal with the species belonging to the genera. For these genera are so closely allied that they only differ, and that merely

'on paper,' in the "tardy dehiscence" of the pod in Millettia, its "indehiscence" in Pongamia and Derris. As a matter of fact Mr. Bentham has placed in Derris a species (D microptera) the pods of which dehisce, while Mr. Kurz has placed in Millettia a species (M. monticola) that has the pods of a Derris. No taxonomist, however able, can venture in the absence of fruit to do more than suggest to which of the three genera a particular species should be referred. A fourth genus to which similar remarks apply is Lonchocarpus; this only differs from species of Derris that have thin pods, exactly as Pongamia differs from species of Derris that have turgid pods, in having sutures without wings. It is, moreover, a suspicious fact that Koorders and Valeton (Bijdr. II,) find the same difficulty in separating Pongamia from Millettia.

In the works of Roxburgh and of Wight and Arnott, also in Bentham's account of the Leguminose in Plant. Junghuhn., Millettia was not divorced from Derris and its allies; Miquel and Kurz, too, continued to place the genera side by side. And certainly if they have adopted the less natural method of arrangement, it cannot be denied that, in so doing, these authors have retained a much more convenient one.

#### 29. Kunstleria Prain.

Woody climbers with unequally pinnately 1-7-foliolate exstipellate leaves; stipules small, deciduous. Flowers rather small in ample terminal thyrsoid panicles extending into the axils of the upper leaves; pedicels solitary, nodes not turnid. Calyx campanulate, teeth lanceolate the two upper connate. Corolla distinctly exserted; standard ovate entire; keel boat-shaped the petals slightly cohering. Stamens diadelphous the upper one quite free from the other 9 and adnate at base to standard claw; anthers versatile uniform on alternately short and long free filaments. Ovary sessile, few-ovuled; style incurved filiform, stigma capitate. Poil thin flat strap-shaped membranaceous or coriaceous, indehiscent, style terminal, sutures not winged. Seeds 1-3, much compressed, oblong; radicle inflexed. Species 5, Malayan.

This interesting genus possesses the habit of Spatholobus with the calyx and almost the corolla and stamens of that genus. It differs, however, in having its flowers solitary in place of fascicled on tumid nodes; in having exstipellate leaflets varying in number in different species from 1–7; and in having the pod quite indehiscent with the seeds centrally not terminally situated, in this last character being indistinguishable from Lonchocarpus. From Lonchocarpus however Kunstleria differs in having the flowers unfascicled, in having the calyx toothed, and in having the stamens diadelphous. As regards inflorescence Kunstleria agrees exactly with Derris § Aganope and agrees moreover with that group of species in having the vexillary stamen free. But here again Kunstleria differs in having a wingless pod and a toothed calyx, and in having the free stamen adnate to the standard claw. With the calyx of Spatholobus then, we have associated in Kunstleria the inflorescence of Aganope and the pod of Lonchocarpus.

The genus is dedicated to the memory of Herr H. H. Kunstler, one of the most enthusiastic, as he was one of the most painstaking and faithful of the collectors who have laid down their lives in the cause of science in the tropics.

Leaflets solitary, with petiolules attached slightly within margin of lamina:—

Leaflets and petioles glabrous on both surfaces ... ... la. K. Curtisii,
Leaflets and petioles subscabridly pubescent ... 1b. K. Curtisii
VAR. laziflora.

Leaflets several, with petiolules attached to margin of lamina:—

Leaves 3-foliate, (leaflets and petioles glabrous; pods narrower
than in the other species of which pods are known) ... 2. K. Kingii.

Leaves 5-foliate:—

Leaflets thickly coriaceous, densely ferruginous underneath
Leaflets chartaceous, glabrous on both surfaces... 4. K. Ridleyi.

Leaves 7-foliate, (leaflets and petioles subscabridly pubescent) 5. K. Derryi.

1. Kunstleria Curtisii Prain. A shrubby climber with slender branches; bark brownish lenticular. Leaves 5-8 in. long, leaflet 1, ovate-lanceolate 4-6.5 in. long, 2.5 in. wide, apex acute base rounded, lateral nerves ascending 4-5 pairs rather prominent as is the midrib beneath, margin entire; rigidly chartaceous, pale-green; petiole .75-1.5 in. long, petiolule .25 in. subpettately attached. Flowers in copious terminal and axillary panicles 8-12 in. long, 5-8 in. across, rachis and branches rusty-pubescent; pedicels pubescent .08 in. long. Calyx campanulate densely pubescent, .15 in. long, teeth triangular except the upper broadly deltoid bifid at tip half as long as tube. Corolla apparently purple, .25 in. long, standard ovate-oblong. Pod thin flat densely rusty-pubescent, 5 in. long 1 in. wide, 2-3 seeded.

Var. typica; leaves above and petioles glabrous, leaves beneath and petiolules sparsely adpressed-pubescent with whitish hairs; rachis and branches of panicles sparsely rusty-pubescent; pods distinctly reticulated.

PENANG; at Tulloh Bahang, Curtis 3019!

VAR. laxiflora; leaves on both surfaces subscabridly, petioles and petiolules densely softly pubescent with rusty tomentum, as are the rachis and branches of the laxer more spreading panicles; pods more densely velvety not visibly reticulated.

PANGKORE; Tulloh Sera, Curtis 1632!

The calyx and corolla, so far as the limited material goes, are not distinguishable in these two plants. The measurements of pod given are taken from fruits of the typical variety; the pods of the other are much smaller but are apparently not so far advanced. When fuller material of these two plants is available it may be necessary to consider them specifically distinct; on the other hand their leaves, but for the different pubescence, are quite similar and it may prove unnecessary to separate them even as varieties.

2. Kunstleria Kingii Prain. A very extensive climber over 100 feet long, with slender branches; bark brown lenticular. Leaves 5-8 in. long, leaflets 3 ovate-lanceolate 4-6 in. long, 1.5-2 in. wide, apex acute,

base of lateral leaflets rounded, of central rather the larger shortly cuneate, lateral nerves ascending 5-6 pairs rather prominent as is the midrib beneath, margin entire; firmly chartaceous pale-green glabrous on both surfaces, petiole glabrous 1·5-2·5 in. long, petiolules glabrous ·2 in. marginally attached. Flowers in copious terminal and axillary panicles 8-12 in. long, 5-8 in. across, rachis and branches rusty-pubescent; pedicels pubescent ·08 in. long. Calyx campanulate densely pubescent ·15 in. long, teeth triangular except the upper broadly deltoid bifid at tip almost as long as tube. Corolla dark-purple, ·25 in. long, standard oblong. Pod thin flat densely brown-pubescent and distinctly reticulated, 2-4 in. long, ·6 in wide, 1-2 seeded, seeds oblong 1·25 in. long, ·5 in. wide, cotyledons thin and leaf-like, testa very dark brown.

PERAK; Larut, Kunstler 3830! 6870! 6935!

Among the many specimens sent by Mr Kunstler only one has a leaf with a solitary leaflet, all the other leaves are 3-foliolate. The individual leaflets are extremely like those of typical K. Curtisii and only differ in not being slightly peltate and in being hardly so thick; the pods however are very different.

3. Kunstleria Forbesii Prain. A small shrubby climber 6-10 feet long, with densely rusty-pubescent branches. Leaves 8-10 in. long, leaflets 5 elliptic, 3.5-5 in. long, 2-2.5 in. wide, terminal rather exceeding the others, bases of all rounded, apex rounded shortly abruptly acuminate, lateral nerves spreading, 6-9 pairs, rather prominent as is the midrib beneath, margin entire; rigidly coriaceous dark-green subscabrid above densely rusty velvety beneath, petiole rusty-puberulous 3.5 in. long, petiolules 25 in. densely rusty-pubescent. Flowers in rather strict terminal and axillary panicles 12-18 in. long 5-6 in. wide, rachis and branches densely rusty-velvety, as are the very short pedicels and lanceolate bracts 1 in. long. Calyx campanulate, densely rusty-velvety, 15 in. long, teeth lanceolate except the triangular slightly bifid upper almost as long as tube. Corolla deep lake-red, 25 in. long, standard oblong. Pod not seen.

Perak; Salama, Kunstler 3094! Distrib. Sumatra (Forbes 3241!).

4. Kunstleria Ridleyi Prain. A climber with slender puberulous branches. Leaves 6-8 in. long, leaflets 5 elliptic, 2-3·5 in. long, 1·25-2 in. wide, terminal considerably larger than the others, bases of all narrowly truncate, apex tapering to a finally somewhat abrupt blunt point, lateral nerves ascending, 5-6 pairs, rather prominent as is the midrib beneath; margin entire, firmly chartaceous pale-green glabrous on both surfaces, petiole sparsely pubescent 2-3 in. long, petiolules rusty-pubescent, 2 in. long, marginally attached. Flowers in rather strict terminal and axillary panicles 12-18 in. long, 4-5 in. across, rachis and branches sparsely rusty-pubescent; pedicels very short, and subulate bracts '08 in.

long, densely rusty. Calyx campanulate densely rusty, '15 in. long, teeth triangular except the broadly deltoid slightly bifid upper, rather more than half as long as tube. Corolla '25 in. long, standard broadly ovate. Pod thin flat densely rusty-pubescent and distinctly reticulated, 6 in. long 1'25 in. wide.

SINGAPORE; Ridley, 6395!

A very distinct species, in inflorescence most resembling K. Forbesii but with leaves of the consistence and appearance of those of K. Kingii, though with 5 leaflets in place of 3. The pod however is very different from that of K. Kingii, and resembles that of K. Curtisii, the chief difference being that the meshes of the reticulations on the valves are much opener in K. Ridleyi than in K. Curtisii.

5. Kunstleria Derryi Prain. A climber with densely pale-rusty pubescent branches. Leaves 6-8 in. long, leaflets 7, ovate-lanceolate, 1-3 in. long '75-1'5 in. wide, terminal with deltoid base considerably exceeding the lateral with rounded bases, all with cuneate apex, lateral nerves ascending 6-7 pairs, rather prominent as is the midrib beneath, margin entire; rigidly chartaceous pale-green subscabridly pubescent on the nerves above, uniformly subscabrid beneath as are the petioles 2.5-3 in., and the marginally attached petiolules 2 in. long. Flowers in rather strict terminal and axillary panicles 12-15 in. long 2-3 in. wide, rachis and branches softly pale-rusty as are the very short pedicels and the very small lanceolate bracts. Calyx campanulate, densely rusty-pubescent, '15 in. long, teeth triangular, upper rather broader, notched, half as long as tube. Corolla dark-purple '25 in. long, standard oblong. Pod not seen.

Malacca; Machap Tebung Road, Derry 1006!

Leaves and branches with exactly the pubescence of K. Curtisii van. lawiflora but with 7 leaflets instead of a solitary leaflet and with marginally, not subpoltately attached petiolules.

# 30. Dalbergia Linn. fil.

Trees or climbing shrubs. Leaves with alternate subcoriaceous leaflets. Flowers copious, small, in terminal or lateral panicles. Calyx campanulate; teeth 5, distinct, usually short. Corolla exserted; standard broad; keel obtuse, with its petals only joined at the tip. Stamens 9-10, monadelphous, the sheath split above, or diadelphous, the sheath split also down the keel; anthers minute, basifixed, with the cells back to back, and the slit mostly short and apical. Ovary stalked, fewovuled; style short, incurved, glabrous, stigma capitate. Pod oblong or strap-shaped, usually thin and flat, 1-4-seeded, indehiscent, not thickened or winged at the sutures. Species 60-70, cosmopolitan in the tropics.

Stamens in two lateral phalanges of 5 filaments each, pod thin and flattened except opposite the seeds (§ Dalbergaria)	1. D. volubilis.
Stamens monadelphous:— Pod thin and flattened except opposite the seed (§ Sissoa)	
[unknown in D. Hullettii]:—	
Flowers contemporaneous with the leaves; climbing	
species:—	
Standard narrow, claws of petals shorter than calyx	
tube:—	
Pod very short-stalked; flowers '25 in. long in pani-	
cles of congested corymbs (leaflets 1 in. or more in	
length)	2. D. confertiflora.
Pod distinctly stalked; flowers minute ('15-'2 in.)	• •
in lax corymbose cymes:-	
Leaflets 6-1.5 in. long; corymbs mostly terminal;	
ovary puberulous	3. D. Junghuhnii.
Leaflets '2-4 in, long; corymbs smaller axillary	o. D. b wrog row retreet.
	1 D subsummetts
and terminal; ovary glabrous	4. D. subsympathe- tica.
Standard orbicular, claws of petals as long as calyx-	
tube:—	
Leaflets rather numerous, membranous, not cus-	
pidate:—	
Leaflets 13-17, 1:5-2 in. long, oblong obtuse or	
subacute; racemes large spreading; calyx and	
leaves densely pubescent	5. D. velutina.
Leaflets 25-41, '6-75 in. long, rhomboid retuse;	
racemes small congested; calyx and leaves thinly	
pubescent	6. D. tamarindifolia.
Leaslets few (1-5), large (2-4 in. long), firm,	
abruptly cuspidate	7. D. pseudo-sissoo.
Flowers preceding the leaves; a small tree, (claws of	** 2. poolulo-818800;
petals as long as calyx-tube)	8. D. Hullettii.
Pod uniformly thickened throughout the valves, the upper	o. D. Hautetti.
suture falcate at least when young (§ Selenolobium):—	
Pods flattened, reticulated, always I-seeded, (upper	
suture recurved when ripe):—	
Lauflate repolle 5 and 1 (and 1 in 1 and 1	
Leaflets usually 5, small (under I in. long), obovate-	0 n
oblong obtuse; flowers many in congested panicles	9. D. torta.
Leaflets usually 3, large (3-3.5 in. long), ovate-	ø
lanceolate acute; flowers few in short spikes 1	0. D. menoëides.
Pods turgid, smooth, often 2-seeded:—	
Upper suture recurved when ripe, pod puberulous;	
leaflets acuminate, large (4-6 in. long), prominently	
veined and when young densely pubescent beneath,	
thickly coriaceous	1. D. Kunstleri.
Upper suture convex like lower when ripe, pod	
glabrous; leaflets glabrous obtuse slightly emar-	
ginate, smaller (2-3.5 in. long), not prominently	
wained homestly 17 * 7	2. D. parviflora.
	113
	110

- § 1. Dalbergaria. Pod thin and flattened except opposite the seeds. Stamens diadelphous in two lateral phalanges of 5 filaments each.
- 1. Dalbergia volubilis Roxb. Cor. Pl. II, 48 t. 191. A large woody climber, 40-60 feet high, with twining glabrescent branches here and there thickened and twisted into spiral hooks. Leaves 4-5 in. long, leaflets 11-13 obovate, or ovate-oblong rounded, obtuse or slightly retuse faintly mucronulate at apex, dark-green above paler beneath, glabrous on both surfaces, 75-1 in. long 5-75 in. across; rachis 3-4 in. long and petiolules 15 in. long, quite glabrous. Flowers in copious terminal and axillary panicles 8-12 in. long with glabrous peduncles and with numerous horizontal or decurved puberulous branches 1-3 in. long bearing corymbose cymes, ultimate corymbs densely congested; bracts at base of branches of panicle small ovate subpersistent; pedicels slender puberulous, lower 2 in. long upper very short with a small lanceolate persistent bracteole at base and two small ovate ones embracing the lower fifth of calyx-tube. Calyx campanulate, densely puberulous 1 in. long, teeth lanceolate lowest exceeding the others. Corolla pale-blue 25 in. long, standard broadly orbicular emarginate, reflexed at junction of blade and claw. Stamens 10, in two lateral groups of 5 each. Pod distinctly stalked, linear-oblong obtuse membranous, 2-3 in. long, 1 in. wide; 1-2-seeded. Hort. Beng. 53; Fl. Ind. III, 231; DC. Prodr. II, 417; Wall. Cat. 5874; W. & A. Prodr. 265; Benth. in Journ. Linn. Soc. IV, Suppl. 46; Bak. in Flor. Brit. Ind. II, 235.

Andamans; very common. DISTRIB. Throughout India and Indo-China.

By an oversight this is described in the F. B. I. as having ebracteate pedicels; in reality each pedicel has three persistent bracteoles, one at its base, two at its apex.

- § 2. Sisson. Pod thin and flattened except opposite the seeds. Stamens monadelphous.
- 2. Dalbergia confertificae Benth. Pl. Jungh. 255. A large climber with sparsely puberulous, soon glabrescent branches. Leaves 4-6 in. long, leaflets firm 11-15, oblong obtuse or retuse, green and glabrous above paler and sparsely puberulous beneath, 1-1.5 in. long, .5-75 in. wide; rachis 3-4 in. long, glabrous as are the petiolules .2 in. long. Flowers rather small in ample terminal and axillary panicles, 3-5 in. long, of corymbosely or subcapitately crowded cymes; peduncle and branches rather densely pubescent; bracts puberulous minute ovate deciduous; solitary bracteoles at base of pedicels also ovate deciduous; pair at base of calyx ovate-lanceolate persistent embracing lower fifth of calyx-tube. Calyx .15 in. long, pubescent, rather narrowly tubular, teeth short obtuse, one-third as long as tube except the lower lanceolate half as long

as tube. Corolla white '25 in. long, claws of petals short. Stamens 9 monadelphous. Pod thin glabrous, 2-3 in. long '75-1 in. wide, 1-3-seeded, stalk very short. Benth. Journ. Linn. Soc. IV, Suppl. 41; Bak. in Flor. Brit. Ind. II, 233.

Andamans; very common. Distrib. Eastern Himalaya, Assam, Chittagong, Pegu.

A very distinct species; the description of the pod given in the Flora of British India is apparently taken from another species.

3. DALBERGIA JUNGHUHNII Benth. Pl. Jungh. 254. A shrubby climber 15-30 feet long, with twining glabrous branches, here and there twisted and thickened into spiral hooks. Leaves 4-5 in. long, leaflets 7-15, oblong or elliptic, rounded at both ends faintly emarginate at the apex, green and glabrous above, glaucescent and glabrous or faintly puberulous beneath, 6-1.5 in. long 35-75 in. wide; rachis 2.5-4 in. long, petiolules 15 in. long. Flowers minute, secund in an ample terminal and in smaller axillary paniculate cymes 2 in. wide and as long as the leaves, peduncle branches and pedicels pubescent; bracts minute caducous; bracteoles all persistent, one at base of short pedicel lanceolate acuminate very minute, two at base of calyx ovate-obtuse embracing the lower third of calvx-tube. Calvx 08 in. campanulate, teeth short obtuse one-third as long as tube, except the lower acute half as long as tube. Corolla white, 15 in. long, claws of petals short. Stamens 9 monadelphous. Ovary pubescent. Pod thin membranous greenish, glabrous, 2.5-3 in. long, 1-1.3 in. wide, 1-seeded, slightly cuneate at base and distinctly stalked.

Var. typica; leaflets usually 7-9, oblong, glabrous or only faintly puberulous beneath. D. Junghuhnii Benth. Journ. Linn. Soc. IV, Suppl. 33; Miq. Flor. Ind. Bat. I, 129; Bak. in Flor. Brit. Ind. II, 233.

Penang; 500 feet, Curtis! Malacca; Maingay 547! 547/2! Goodenough! Derry! Singapore; Hullett 141! Ridley! Distrib. Sumatra, Java.

Van. Scortechinii Prain; leaflets 11-15 elliptic, beneath more closely puberulous especially on midrib.

Penang; Ayer Etam, Curtis 1437! Malacca; Bijong, Scortechini 1830! Maingay 549! Singapore; Bukit Timah, Ridley 6406! DISTRIB. Borneo.

These two plants differ in no way as regards flowers; the leaves however differ considerably in appearance and it may ultimately be found that the second variety—of which the fruit is as yet unknown—should be known as a distinct species, Dalbergia Scortechinii. The original specimens on which Mr. Bentham founded the species were collected by Junghuhn in Sumatra and by Griffith in Malacca; the writer has not seen either. Mr. Bentham describes the ovary as glabrous in his

specimens, it is hairy in all the specimens above cited where there are flowers. The most nearly related species are D. subsympathetica, which has much smaller leaflets with rather larger flowers in more numerous less ample cymes; and D. sympathetica which also has rather larger flowers and smaller leaflets. In D. sympathetica however the leaflets are more numerous and the pod though similar is more shortly stalked.

Mr. Bentham, who had not seen fruit of this when he wrote, suggested that this might prove to be the same as *D. parviflora* Roxb. One objection to this suggestion is the very small number of leaflets described by Roxburgh; a still more fatal objection, however, is in the pod; this Roxburgh describes as falcate,—an indication that *D. parviflora* should be sought for in § Selenolobium rather than in § Sissoa.

4. Dalbergia subsympathetica Prain. A tall climber 60-80 feet long, less often a scandent shrub or small tree 15-30 feet high, with twining puberulous branches. Leaves 1.5-3 in. long, leaflets 9-15 oblong. apex truncate or emarginate base wide-cuneate or rounded, green and glabrous above, paler and pubescent with long adpressed hairs beneath, 25-4 in. long, 2-3 in. wide; rachis 1-25 in. long, densely puberulous as are the petiolules 1 in. long. Flowers minute secund, in small axilary paniculate cymes, '75-1 in. across, as long as the leaves, peduncle ·5-7 in., branches and pedicels pubescent; bracts minute caducous; bracteoles all persistent, one at base of short pedicel lanceolate, acuminate, very minute, two at base of calyx ovate-obtuse embracing lower fourth of calyx-tube. Calyx 1 in campanulate, teeth short obtuse onethird as long as tube, except the lower acute half as long as tube. Corolla white, 2 in. long, claws of petals short. Stamens 9, monadel-Ovary glabrous except along anterior suture. Pod thin membranous greenish glabrous, 2.5 in. long, 1 in. wide, 1-seeded; slightly cuneate at base and distinctly stalked.

Penang; Curtis 1492! Perak; Scortechini 201! 1071! Wray 2086! 3205! Kunstler 2354! 3562! 4978! 5182!

Very near D. Junghuhnii and just possibly only a variety of that species; it is however easily distinguished by its much smaller leaflets and its smaller, more numerous cymes of rather larger but still very minute flowers.

5. Dalbergia velutina Benth. Pl. Jungh. 255. A long climber with rusty densely pubescent branches. Leaves 6-8 in. long, leaflets 13-17, oblong obtuse or subacute membranous, 1·5-2 in. long, '6-8 in. wide, dark-green glabrescent to puberulous above, rusty-puberulous to pubescent beneath, stipules large densely pubescent, rachis 5-6 in. long puberulous or pubescent, as are the petiolules 1 in. long. Flowers in somewhat dense axillary panicles, with corymbose branches, 4 in. long 2·5 in. wide, the peduncles branches and pedicels densely pubescent, bracts rather large ovate and bracteoles narrowly lanceolate persistent pubescent; the pair at base of calyx half as long as pedicel one-third as

long as calyx-tube. Calyx 15 in. long, pubescent, campanulate, teeth acute upper shorter than lanceolate lower. Corolla white or pink, 25 in. long, claws of petals as long as calyx-tube. Stamens 9 monadelphous. Pod thin obtuse brownish, short-stalked, 1-seeded, 2-3 in. long, 6-7 in. wide.

Var. typica; leaves beneath, leaf-rachis, linear-lanceolate stipules, peduncles and bracts pale rusty-velvety. D. velutina Benth. Journ. Linn. Soc. IV, Suppl. 43; Bak. in Flor. Brit. Ind. II, 233. D. stipulata Wall. Cat. 5868.

MALACCA; Maingay! DISTRIB. Burma, Assam.

VAR. Maingayi Prain; leaves puberulous glaucescent beneath; leaf-rachis, ovate-acuminate stipules, peduncles and bracts very darkly rusty-puberulous.

MALACCA; Maingay 612! SINGAPORE; Ridley! DISTRIB. Tenasserim (Griffith 1798); Malay Archipelago.

The only pods of true *D. relutina* at Calcutta are still unripe; the description of the fruit is therefore taken from Mr. Baker's account: to Mr. Bentham the fruit was unknown.

Of var. Maingayi which, as a note made in Herb. Kew indicates, is at Kew treated as a "less bairy variety" of D. relutina, the writer has seen no fruit. Not improbably it may be found ultimately necessary to treat it as a distinct species to be known as D. Maingayi.

6. Dalbergia tamarindifolia Roxb. Hort. Beng. 53. A shrubby climber, 15-40 feet high with densely pubescent young branches. Leaves 5-6 in. long, leaflets 25-41, thinly pubescent on both surfaces rather paler beneath, crowded, trapezoid-oblong, 6-75 in. long, 3 in. wide, moderately firm, caducous; rachis densely puberulous 45-55 in. long, petiolules very short; stipules lanceolate densely puberulous '2 in. long. Flowers with the leaves, in congested sessile axillary panicles with corymbose branches 5-2 in. long, 5-1 in. wide, peduncles, branches and pedicels densely puberulous, bracts rather large ovate and bracteoles persistent puberulous; pedicels as long as calyx with solitary bracteole as base and two rather large ovate close under calyx, the lower fourth of which they embrace. Calyx campanulate, glabrescent (in Malayan specimens), pale greenish-yellow, '15 in. long, teeth short obtuse. Corolla white 35 in. long, claws of petals as long as calyx-tube. Stamens usually 9, rarely 10, monadelphous. Ovary glabrous; ovules 2-3. Pod thin greenish. drying bright-brown, glabrous, long-stalked, strap-shaped, subacute; 1-3-seeded; not veined nor thickened opposite the seeds, 1.5-3 in. long, 4-5 wide. Roxb. Flor. Ind. III, 233 (in part only); Wight, Icones, t. 242 (excluding fig. of fruit); Wall. Cat. 5870; Benth. in Journ. Linn. Soc. IV, Suppl. 44; Miq. Flor. Ind. Bat. I, 131; Bak. in Flor. Brit. Ind. II, 234. D. rufa Grah. in Wall. Cat. 5864. D. multijuga Grah. in Wall. Cat. 5865.D. livida Wall Cat. 5866.D. Blumei Hassk. Pl. Jav. Rar. 400.

Andamans; very common everywhere in the main group; Barren Island, Prain! Langkawi; Curtis 2625! Perak; Scortechini 68! Wray 2387! Kunstler 3346! 5963! 6481! 8667! Penang; Wallich 5665! Malacca; Maingay 602! Derry 1167! Distrib. Himalayas from Nepal eastward; Indo-China; Malay Archipelago.

All the Perak and Malacca specimens agree exactly with D. multijuga Grah, and that in turn does not differ even as a variety from D. rufa Grah., with the type of which Curtis' Langkawi specimens and the Andaman form exactly coincide. These two forms differ from the Upper Burma and Himalayan plant in having fewer-fid., laxer panicles, with a glabrescent instead of a downy calyx. The pods are, however, identical in both. It has been usual to quote Roxburgh without qualification as the authority for this species, in spite of the fact that he has described as belonging to it, the fruit that belongs to D. Millettii. And it has been also usual to cite Derris pinnata Lour. as this plant, overlooking the fact that Derris pinnata has glabrous leaflets and, presumably, only monospermous pods. The writer has not seen Loureiro's original specimens; his description of D. pinnata, however, certainly applies more aptly to D. Millettii than it does to D. tamarindifolia, which moreover does not appear to have such a root as Loureiro describes. In any case until specimens can be produced, D. pinnata should be treated as indeterminable.

7. Dalbergia pseudo-sissoo Miq. Flor. Ind. Bat. I, 128. A shrubby climber 15-25 feet long with twining, glabrous branches. Leaves glabrous medium-green, 6 in. long, leaflets firm 1-5, oblong slightly narrowed from beyond the middle to the cuneate or rounded base, widely rounded and abruptly cuspidate at apex, 2-4 in. long 1-2 in. wide, rachis 2-3 in., petiolules 25 in. long. Flowers in lax axillary panicles with subcorymbose branches, 2.5-3.5 in. long and almost as broad, the branches finely grey-downy; pedicels 15 in. long with slender subulate bracteoles under the calyx. Calyx campanulate 2 in. long, externally puberulous, teeth widely triangular obtuse much shorter than the tube. Corolla 35 in. long, petals creamy-white with pink tips their claws as long as the calyx. Stamens 9 monadelphous. Ovary long-stalked, densely pubescent 1-, or often 2-ovuled, style slender incurved. Pod brownish, strapshaped, obtuse, 3-4 in. long, 5-65 in. wide, seed solitary. D. Championii Thw. Enun Pl. Zeyl. 95; Benth. in Journ. Linn. Soc. IV, Suppl. 39; Bak. in Flor. Brit. Ind. II, 231. D. Sissoo Miq. Flor. Ind. Bat. I, 128 not of Roxb.

Perak; Larut, Kunstler 3177! 3340! 3579! 4964! 6565! Scortechini 1348! Wray 2098! 2965! Penang; Government Hill, Curtis! Singapore; Bukit Mandai and elsewhere, Hullett! Ridley! DISTRIB. Ceylon; Malay Islands.

The doubt that has hung over the identity of this species has at length been 118

cleared up through the kindness of Dr. J. V. Suringar. Both Mr. Bentham and Mr. Baker have suggested that it may be the same as D. pseudo-sissoo Miq. and in response to a request made by Dr. King that some Malayan specimens from Calcutta, which are undoubtedly conspecific with the Ceylon plant, might be compared with the Miquelian types at Leiden, Dr. Suringar has not only made the necessary comparisons but has sent to Calcutta examples of some of the authentic specimens and very careful drawings of others. These leave no doubt whatever as to the identity of the two plants named D. pseudo-sissoo and D. Championii. One curious feature has been noticed in this examination by Dr. Suringar and by the writer. In Cevlon (as Mr. Bentham found) and in Penang the ovaries appear to be always 1-ovuled; in Perak, Singapore and Borneo they are oftener 2-ovuled than 1-ovuled in the proportion of 7 to 3; in Java they are nearly always 2-ovuled, nine ovaries having 2 ovules for one ovary with 1 ovule. A still more interesting discovery made by Dr. Suringar is that D. Sissoo Miq. is not D. Sissoo. Roxb. (this no one who considers what the native habitat of D. Sissoo is, will be surprised to learn), but that it is (what was hardly to be expected) Dr. Miquel's own D. pseudo-sissoo. Dr. Suringar, in confirmation of his discovery, has sent to Calcutta an authentic specimen of D. Sissoo Mig. in Herb. Leiden (not of Roxb.). This then explains the "unfortunate selection" of name that Mr. Bentham very justly comments upon. Dr. Suringar, sharing Mr. Bentham's feeling, suggests that in view of this extraordinary confusion it would be better to drop Miquel's name altogether; and the writer would very gladly have adopted the suggestion and continued to use Dr. Thwaites' name D. Championii, had the dictates of common-sense been of any weight in modern nomenclature. But unfortunately there is now no doubt that the plant named D. pseudosissoo by Miquel is the same as that named D. Championii by Thwaites; it cannot be gainsaid that so far as it goes, the description of D. pseudo-sissoo applies to the species; and it is clear that the name D. pseudo-sissoo has nine years' priority over the name D. Championii. This being so, Miguel's name may just as well be given precedence now, seeing that one or other of the bibliographers who pose as botanists would make the alteration so soon as this note appears, in spite of the fact that Miquel did not recognise his own species when he saw it.

8. Dalbergia Hullettii Prain. A small tree with blackish rugose rusty-puberulous thickish branchlets, without leaves at time of flowering. Flowers in short, clustered racemes, 1-1.5 in. long, springing from tufts of triangular rusty-pubescent small bracts in axils of old leaves; lowest pedicels longer than the rest, slender, 3 in. long, rusty-pubescent as are the peduncles; bracteoles at base of pedicels solitary ovate-lanceolate 1 in. long persistent, the pair below calyx subulate very small. Calya campanulate, densely rusty-tomentose 15 in. long, teeth half as long as tube, acute. Corolla 3 in. long, claws of petals as long as calyx-tube. Stamens 9, rarely 10, monadelphous. Ovary with densely pubescent stalk; ovule solitary. Pod unknown.

SINGAPORE; Hullett 626!

A very distinct species, only once reported. It is nearest to a Bornean tree apparently as yet undescribed (*Haviland* n. 2894); the only difference between the flowers of the two is that in the Bornean plant the ovary is densely woolly; in this the ovary is quite glabrous though its stalk is pubescent. The Bornean plant has

leaves with solitary or trifoliolate leaflets; when trifoliolate the lateral leaflets are subopposite. It thus approaches most nearly to D. pseudo-sissoo which also has flowers similar to those of D. Hullettii and of Haviland's species from Borneo.

- $\S$  3. Selenolobium. *Pod* thickened throughout upper suture, recurved at least while young.
- 9. Dalbergia torta Grah, in Wall. Cat. 5873. An unarmed littoral climber with twining glabrescent branches often twisted into spiral hooks. Leaves 3 in. long, leaflets 5 (very rarely 7 or 3), obovateoblong obtuse sometimes emarginate, dark-green and glabrous above paler and sparingly adpressed-puberulous beneath, 6-8 in. long, 4-6 in. wide; rachis 2 in. long glabrous as are the petiolules '1 in. long. Flowers in sessile congested axillary panicles, 1-2 in. long, with very slightly puberulous branches, bracts small ovate-lanceolate persistent: pedicels very short with a small ovate-lanceolate bracteole at the base and with two larger ovate bracteoles under the calvx embracing lower third of its tube. Calux glabrescent, wide-campanulate, 15 in. long. teeth short, wide-triangular, obtuse. Corolla white, 25 in. long, claws of petals as long as calyx-tube. Stamens 10 monadelphous. Pod brown flat glabrous, 9 in. long, 5 in. wide, upper suture recurved, rather thick-walled throughout, 1-seeded; stalk as long as calvx. D. monosperma Dalz. in Hook. Journ. Bot. II, 36; Benth. in Journ. Linn. Soc. IV, Suppl. 48; Miq. Flor. Ind. Bat. I, 132; Bak. in Flor. Brit. Ind. II, 237.

Andamans: very common on all the coasts of the main group; Narcondam, Prain! Penang; Wallich 5873! Curtis 220! Langkawi; Curtis 2868! Perak; coast at Matong, Scortechini 1099! Wray 2502! Malacca; at Tanjong Kling, Ridley 3312! Singapore; growing in salt water, Kunstler 66! Krangi, Ridley 5576! T. Anderson! Kurz! Distrib. Western coasts of India; Sundribuns; Burma; Borneo; New Guinea; Chiua.

A purely littoral species. The citation of Wall. Cat. 5879 by Dr. Miquel and Mr. Baker for this species is due to their having copied the statement from Mr. Bentham. By an uncorrected printer's error Mr. Bentham is made in the description to quote this number, though in the notice of localities the number 5873 is correctly given.

10. Dalbergia menorides Prain. An unarmed climber with glabrous, twining, hooked branches. Leaves 5 in. long, leaflets 3, ovate lanceolate tapering to both ends, dark-green and glabrous above, paler and sparsely adpressed-puberulous beneath, 3-3.5 in. long, 1-1.5 in. wide; rachis 1.5 in. long, glabrous, petiolules 08 in. puberulous. Flowers very few, sessile, clustered at tips of short puberulous axillary peduncles 15-25 in. long, each with two ovate bracteoles embracing lower fourth of calyx-tube. Calyx campanulate, externally sparingly

puberulous 15 in. long, teeth short subequal obtuse. Corolla 35 in. long, claws of petals as long as calyx-tube. Stamens 10 monadelphous. Ovary glabrous, ovule solitary. Pod greenish, semilunar, flat, glabrous, firm, reticulated throughout, upper suture recurved, 15 in. long, 75 in. wide: 1-seeded; tip acute, stalk rather longer than calyx.

PERAK; Krian, Scortechini 1392!

 $\Delta$  very distinct species with leaflets somewhat resembling those of D. pseudo-sissoo.

Dalbergia Kunstleri Prain. An extensive climber 40-150 11. feet long with stem 3-6 in. in diam. and pubescent young branches. Leaves 10-12 in. long, leaflets 7-9, the lateral ones subopposed, darkgreen quite glabrous above, dark-grey when young densely pubescent when old sparsely puberulous beneath, rigidly coriaceous, elliptic-acuminate, 4-6 in. long, 2 in. wide, with very prominent midrib and 8-9 pairs of spreading lateral veins beneath, secondary venation also distinct, rachis 8 in, long, petiolules 3 in. long at first densely pubescent ultimately glabrescent. Flowers in axillary panieles 4-6 in. long with spreading rusty-puberulous branches, bracts and bracteoles deciduous, pedicels under 1 in. Calyx 15 in., teeth lanceolate except the upper, the lowest twice as long as the tube. Corolla dark-blue, 35 in. long, standard orbicular emarginate. Stamens monadelphous. Ovary pubescent. Pod finely puberulous, rigid, much thickened throughout, 1-2-seeded, 1.5-2.5 in, long, 9 in, wide, 3 in, thick, short-stalked, dark-brown to almost black when ripe, with grey lines alongside the sutures.

Perak; Goping, Kunstler 4736! Kinta, Kunstler 7067!

A very fine species nearest to *D. reniformis*; it differs in being a climber whereas that species is a tree; in having blue flowers whereas that species has them white; in having larger and thicker leaves and larger pods. The pod is quite indehiscent but as the seed matures the epicarp cracks alongside both sutures so that, when quite ripe, the pod, as Kunstler remarks in a field note, shows a "grey seam" due to the exposure of the mesocarp along two lines parallel to each suture. Sometimes the pod consists of but one reniform segment with a solitary seed; usually however there are two segments though the seed inside the distal segment rarely developes; when this happens the epicarp does not give way, and there is then no "grey seam" along the suture.

12. Dalbeegia parviflora Roxb. Hort. Beng. 98. A strong climber 30-80 feet long with glabrous branches. Leaves 6-8 in long, leaflets 5-9, ovate-lanceolate with obtuse slightly emarginate tips, light-green quite glabrous on both surfaces, finely reticulately veined beneath, 2-3.5 in long 75-1.5 in wide; rachis 2-3 in and petiolules 15 in long, glabrous. Flowers very small in axillary and terminal panicles of congested dichotomous cymes with puberulous branches; bracts rounded ciliate deciduous; bracteoles at base of very short pedicels rounded persistent,

the pair at base of calyx oblong ciliate embracing lower half of tube. Calyx 08 in., campanulate, teeth obtuse upper two connate, lower three subequal all as long as tube. Corolla white, 15 in. long, claws of petals short. Stamens 10, monadelphous. Ovary glabrous. Pod turgid 1-3-seeded; 75-2 in. long, 6 in. wide, when young falcate along upper, when ripe convex along both sutures, when 2- or 3-seeded torulose between the seeds. Flor. Ind. III, 225; Miq. Flor. Ind. Bat. I, 132; Benth. Journ. Linn. Soc. IV, Suppl. 33. D. Cumingiana Benth. Pl. Jungh. 255; Journ. Linn. Soc. IV, Suppl. 32; Miq. Flor. Ind. Bat. I, 129. D. Zollingeriana Miq. Flor. Ind. Bat. I, 130. Drepanocarpus Cumingii Kurz, Journ. As. Soc. Beng. XLV, pt. 2. 282.

Andamans; Helfer 1808! Dindings; Curtis! Pahang; Ridley 1374! 2639! Perak; Matang Jambu, Wray 2525! Goping, Kunstler 1423! 5973! 6151! Scortechini! Distrib. Malay Archipelago.

Regarding this plant Mr. Hemsley has noted:—"This agrees with Kew speci"mens of *D. reniformis* Roxb." This species, however, is a climber whereas *D. reniformis* is a tree; Roxburgh's *D. reniformis* has moreover much larger flowers and, as
in *D. Kunstleri*, the fruits of *D. reniformis* remain falcate along the upper suture
even when ripe.

That this is *D. parviflora* Roxb. hardly admits of a doubt. Mr. Bentham and Mr. Baker have, indeed, suggested that *D. parviflora* may be the same as *D. Junghuhnii*; in spite of the very great authority of these authors this suggestion must be abandoned as untenable. The number and, still more, shape of the leaflets make the identification impossible; moreover, Roxburgh's account of the pod shows that his species must be, as Miquel admits, a *Selenolobium* and not as Bentham and Baker suppose, a *Sissoa*. Roxburgh's description is meagre in the extreme; but since *D. Cumingiana* provides a species that exhibits all the characters of *D. parviflora* and as no other Malayan species of *Dalbergia* hitherto found does so, it seems imperative to use Roxburgh's name for the species.

A more interesting question regarding this plant is, however, its supposed identity with Rumphius' Lacca lignum (Herb. Amboin, V, 17, t. 13). So far as Calcutta specimens go the only authority for the belief is the existence of a specimen from Halmaheira (Teysmann n. 5668) on which Mr. Teysmann has written "Kayoe lakka" and another from Tarabangie, Lampongs, Sumatra (Hort. Bogor n. 444)) also collected by Mr. Teysmann and also marked "Kayoe lakka." It is remarkable that our other Sumatra specimens, collected on the R. Rawas by Dr. H. O. Forbes (Forbes n. 3216), have no note to this effect, and just as remarkable that collectors so careful as Mr. Ridley, Fr. Scortechini, Herr Kunstler and Mr. Wray, who have sent us numerous specimens of the same species, should have made no note regarding it. Their silence renders the matter doubtful, and appears to afford good ground for Dr. Kuntze's refusal (Rev. Gen. Plant. I, 158) to accept the identification proposed by Teysmann and adopted by Hasskarl (Neue Schluessel zu Rumph. p. 90). As Kuntze justly remarks, the meagre account of the flower given by Rumphius does not fit the present species since Ramphius says it has two petals, and though the general habit agrees that alone hardly suffices for identification. The calyx of the only open flower in the figure quite accords with the calyx of our plant and the fruit also quite agrees. But the uppermost branchlets are shown as curved and twisted like those of D. torta while those lower down are figured as passing into spines like those of D. spinosa, two species that, though they belong to the same section of Dalbergia, are nevertheless very different from D. parviflora. None of our very numerous specimens show either hooks or spines, nor have any of the field-notes that accompany the specimens a reference to spines on the stem.

In the Herbarium of the Penang Forest Department, kindly lent by Mr. Curtis, there is however a specimen from Lumot in the Dindings, to which the native name "Kayu Laha" is attached along with the further note, "climber; wood valuable, used as incense." This specimen, from a widely remote locality, thus bears a note made without reference to the controversy that has arisen regarding Kayoe lakka but that entirely confirms the notes of Mr. Teysmann, who was, it may be remarked, one of the most careful collectors that has ever worked in Malaya. The existence of this specimen therefore re-opens the whole question, which may be commended to Malayau field-betanists as one worthy of attention and solution. To judge from Rumphins' account there were, in his time, three if not four species included under the name Caju Lacca and of one, at least, of these he says that it had no spines, only thickened nodes instead. It seems quite certain that D. parviflora must have been one of the four. But whether his figure is meant to represent it or has been made to include some of the characters of the others as well, can only be known when all four are completely understood.

### 31. PTEROCARPUS Linn.

Erect trees. Leaves with alternate coriaceous exstipellate leaflets. Flowers yellowish, in copious panicled racemes; bracts and bracteoles minute, caducous; pedicels distinctly articulated at the apex. Calyx turbinate, curved before expansion, the teeth short. Petals exserted, with long claws; standard and wings crisped; keel obtuse, the petals scarcely or not at all coherent. Staminal sheath slit both above and below, or above only; the upper stamen often nearly or quite free; anthers versatile. Ovary stalked, 2-ovuled; style incurved, stigma terminal. Pod orbicular, rarely other than 1-seeded, with a broad rigid wing, the point turned down to opposite the base or near it. Species about 15; cosmopolitan in the Tropics.

Leaflets finely veined throughout, pedicels slender longer than the calyx, beak of pod distinctly raised beyond the outer base ... ... ... ... ... ... 1. P. indicus Leaflets with 5-7 pairs of distinctly raised veins beneath, pedicels stoutish shorter than the calyx, beak of pod

hardly raised beyond the outer base ... 2. P. dalbergioides.
1. Pterocarpus indicus Willd. Sp. Pl. III, 904. A tree 30-40 feet high with widely spreading branches drooping at the end. Leaves 8-10 in. long, leaflets 5-9 moderately firm, 2-4 in long 15-2 in. wide, the terminal rather larger than the others, the rachis usually faintly prolonged, all ovate with rounded rarely deltoid base and rounded

abruptly acuminate apex, glabrous on both surfaces, dark-green, margins entire but distinctly undulate, uniformly finely veined throughout, stipules lanceolate 5 in. long early caducous, petiolules 25 in., glabrous as is the leaf-rachis. Flowers in copious terminal and axillary panicles. rachis and pedicels glabrescent, pedicels 3 in. long, very slender, with 2 linear caducous bracteoles 1 in. long, half as long as bud, at apex. Calya 25 in. long, finely brown-silky, teeth rounded the two uppermost exceeding the others. Corolla yellow, 6 in. long, standard 5 in. across. Pod orbicular, with stalk 3 in. long, 1.75-2.25 in. in diameter, uniformly sparsely adpressed-pubescent with silky hairs, rather distinctly anastomotically 2-3-veined opposite the seed, the style usually a considerable distance (65°-100°) above the base, pointing outwards at right angles to the stalk. Roxb. Hort. Beng. 53; DC. Prodr. II, 419; Roxb. Flor. Ind. III, 238; Benth. in Journ. Linn. Soc. IV, Suppl. 77 (in part only); Miq. Flor. Ind. Bat. I, 135; Bak. in Flor. Brit. Ind. II, 238 (in part only). P. Draco Lamk. Ill. t. 602, f. 2, b (not a). P. dalbergioides Wall. Cat. 5843 (letter G only) not of Roxb. P. Zollingeri Mig. Flor. Ind. Bat. I, 136. P. obtusatus Miq. Flor. Ind. Bat. I, 136. P. saxatilis Bl. MSS. in Hort. Bogor. Lingoum saxatile Rumph. Herb. Amboin. II, t. 70.

Penang; Wallich 5843 G! Malacca; Griffith! Maingay 550! Perak; Kunstler 1513! 8713! Scortechini 503! Wray 2003! 2280! Distrib. Northwards throughout Tenasserim to Martaban; southwards to Sumatra and Java.

A fine tree often confused with the next species from which it is, however, very distinct in foliage and somewhat different in habit.

2. PTEROCARPUS DALBERGIOIDES Roxb. Hort. Beng. 53. A tree 60-80 feet high with ascending branches, spreading at the end. Leaves 8-10 in. long, leaflets 5-9, firm, 2-4 in. long 1-1.5 in. wide the terminal rather larger than the others, ovate-lanceolate with deltoid rarely rounded base and gradually narrowing to apex, glabrous on both surfaces, pale-green, margins entire hardly undulate, with 5-7 pairs of distinctly raised veins beneath, stipules lanceolate 5 in. long, early caducous, petiolules 15 in. long glabrous as is the leaf-rachis. Flowers in copious terminal and axillary panicles, rachis and pedicels finely brown-pubescent, pedicels 2 in. long stoutish with 2 very shortly ovate caducous bracteoles under 05 in. long, less than  $\frac{1}{5}$  as long as bud, at apex. ·25 in. long, densely brown silky, teeth rounded the two uppermost exceeding the others. Corolla yellow '4 in. long, standard '35 in. across. Pod orbicular, with stalk 6 in long, 2-2.25 in in diameter, uniformly very finely puberulous and not veined opposite the seed, the style usually a short distance (40°-50°) above the base, pointing slightly downwards. DC. Prodr. II, 418: Roxb. Flor. Ind. III, 236; W. & A. Prodr. 267

Wall. Cat. 5843 (excluding G and, according to W. & A., also excluding D). *P. indicus* Benth. in Journ. Linn. Soc. IV, Suppl. 77, in part; Bedd. Fl. Sylvat. t. 23; Bak. in Flor. Brit. Ind. II, 238 in part, not of Willd.

ANDAMANS; common.

This tree is usually treated as a form of the preceding species, and it has been the fashion to say that the two are not distinguishable by 'botanical' characters. As they grow it would be very hard to mistake them, and when have been carefully examined it becomes difficult to realize that, even in the herbarium, they should ever have been confounded.

#### 32. Arachis Linn.

Annual herbs. Leaves abruptly pinnate, leaflets few; stipules elongated adnate to the petiole. Calyx long-tubular simulating a pedicel, 2-lipped; the upper lip 4-toothed the lower long slender. Corolla resupinate. Stamens (sometimes only 9) united in a tube inserted with the petals on calyx limb; staminal tube grooved on vexillary side but not split; anthers dimorphic alternately on short filaments versatile and on longer subbasifixed. Ovary at first short-stalked, at base of calyx-tube, the stalk soon elongating; style filiform, bearded above; stigma minute. Pod long-stalked ovate-oblong, obtuse at both ends, gibbous, torulose, reticulated, coriaceous, indehiscent, 2-4-seeded. Seeds fleshy, oily. Species 7; six in Brazil, I widely cultivated in the tropics.

ARACHIS HYPOGEA Linn. Sp. Pl. 741. An annual diffuse herb, stems grooved and angled 6-20 in. high, often much branched near base; stems and branches clothed with longish spreading hairs. Leaf-rachis pubescent 2-4 in. long; leaflets exstipellate in 2 opposite pairs, ovate-oblong obtuse with rounded base, l-1.5 in. long, 6-1 in. wide, green and glabrous above, pale and sparsely clothed with spreading hairs beneath; stipules narrow lanceolate 1 in. long, 15 in. wide, upper half free. Flowers 2-7, in leaf-axils along the stem. Calyx-lips 25 in. long, the lower linear the upper 15 in. wide. Corolla 4 in. long, pale-yellow or white; standard suborbicular, glabrous, keel beaked. Pod carried underground by the elongating pedicel, where it ripens; 1-1.25 in. long, 5 in. across; 2-3-seeded. DC. Prodr. II, 474; Miq. Flor. Ind. Bat. I, 218.

SINGAPORE; cultivated, Anderson! Penang; cultivated, Curtis!

The "Ground-Nut," commonly cultivated in India and Malaya, probably originally introduced into the old world from Brazil.

### 33. Zornia Gmel.

Annuals, with large geminate coriaceous bracts and dotted leaflets in 1-2 opposite pairs. Flowers in lax racemes. Calyx minute; upper

teeth short, connate; lowest shorter than the two middle ones. Corolla much exserted; standard broad; keel incurved, acute. Stamens monadelphous; anthers dimorphous. Ovary sessile, many-ovuled; style filiform, incurved, stigma minute capitate. Pod of several small round flattened finely muricated 1-seeded indehiscent joints. Species 10, all but two American.

ZORNIA DIPHYLLA Pers. Synops. II, S18. A diffuse annual with slender zigzag wiry branches reaching 11-15 in. in length, glabrous or sparingly puberulous. Leaf-rachis 25 in. long, puberulous, channelled above; leaflets in one terminal pair, oblong or lanceolate (lanceolate in Malayan specimens), 5 in. long, 12 in. wide, glabrous, conspicuously dotted; stipules lanceolate with a long spur. Racemes laxly 3-12-fld., 1-3 in. long; bracts also dotted, ovate-acute, almost concealing flowers and fruits. Calya minute. Corolla slightly exserted. Pods 1-6-jointed; joints 08 in. long, pubescent, and irregularly sprinkled with harsh prickles. Benth. in Mart. Flor. Bras. XV, 80, t, 21, 22; Bak. in Flor. Brit. Ind. II, 147. Zornia angustifolia Smith in Rees Cyclop. n. 1; DC. Prodr. II, 316; Wall. Cat. 5660; Miq. Flor. Ind. Bat. I, 278. Z. dictyocarpa DC. Prodr. II, 327. Z. gibbosa Span. Linnæa XV, 191. Z. graminea Span. Linnæa XV, 192. Hedysarum diphyllum Linn. Sp. Pl. 747; Roxb. Flor. Ind. III, 353.

SINGAPORE; Changi, Ridley 4672! DISTRIB. Cosmopolitan in the tropics.

#### 34. SMITHIA Ait.

Herbs or undershrubs. Leaflets many small sensitive, opposite, leaf-rachis ending in a bristle; stipules scariose with large auricles. Flowers racemose or axillary. Calyx deeply 2-lipped, the lips usually entire. Corolla exserted; standard orbicular; keel incurved obtuse. Stamens in two bundles of 5 each; anthers uniform. Ovary linear, many-ovuled; style incurved, filiform, stigma minute capitate. Pod of many or few small flattened or turgid joints, folded together inside the calyx. Species 20-30, throughout tropics of the Eastern Hemisphere.

SMITHIA SENSITIVA Ait. Hort. Kew. ed. I, III, 496. A diffuse spreading annual with slender glabrous much branched stems 1-3 feet long, only '12 in. thick at base. Leaf-rachis '5-1 in. long sparsely beset with long whitish bristles; leaflets 3-10 pairs, '25-4 in. long, oblong obtuse, sparsely bristly on the almost straight margins and on the midrib beneath. Racemes simple 1-6-fid., in axils of upper leaves on peduncles '3 in. long, pedicels slender bracteolate '15 in. long or less, ascending; bracteoles small ovate-acute scarious. Calyx '25-3 in. long, lips subequal, entire, acute, with a few scattered subadpressed pale-yellow

bristles. Corolla yellow, glabrous, '4 in. long. Pod 4-6-jointed; faces densely papillose. DC. Prodr. II, 323; Roxb. Hort. Beng, 56; Flor. Ind. III, 342; Salisb. Paradis. t. 92; Miq. Flor. Ind. Bat. I, 272; Bak. in Flor. Brit. Ind. 148. S. abyssinica Hochst. in. Schimp. Pl. Abyssin.

Andamans; a common weed throughout the settlement at Port Blair. Nicobars; Kamorta, Kurz! Distrib. Africa; S.-E. Asia.

Not seen from the other provinces; probably a recent introduction from India. From Java comes a very closely allied plant (S. javanica Miq.) which differs mainly in having no bristles on the calyx; this may be no more than a form of the Indian and African S. sensitiva: all the specimens reported are, however, very uniform.

### 35. ORMOCARPUM Beauv.

Shrubs. Leaves with odd-pinnate exstipellate leaflets and persistent striated stipules and bracts. Flowers in lax racemes. Calyx-tube campanulate; 2 upper teeth deltoid; 3 lower lanceolate. Standard broad; keel much incurved, not at all beaked. Stamens in two bundles of 5 each; anthers uniform. Ovary linear, few-ovuled; style filiform, inflexed, stigma minute terminal. Pod of a few indehiscent turgid linear or oblong joints, the lower seedless, the faces rugose, naked or muricated with weak gland-tipped prikles. Species 6, spread all round the world in the tropics.

Ormocarpum Glabrum Teysm. & Binnend. Nat. Tijd. Ned. Ind. XXVII, 56. A small tree 12-14 feet high, with smooth angular branches; epidermis desquamating. Leaves 6 in. long, leaflets 1 in. long, 4 in. wide, terminal and 8-9 alternate lateral elliptic obtuse mucronate, glabrous, glaucescent beneath; rachis subtrigonous, glabrous, thickened at base; stipules subulate erect. Racemes corymbose, on short peduncles 12 in. long; individual flowers on slender pedicels 5 in. long, 2-bracteo-late above the middle. Calyx 25 in. long, green, campanulate, unequally 5-toothed, glabrous externally; teeth oblong, acute. Corolla much exserted, yellow, purple-veined; standard saborbicular retuse. Ovary long-stipitate, glabrous. Pod 6-7-jointed, ultimately becoming blackish, 5-6 in. long; individual joints 75-1 in. long, externally marked with 6-8 longitudinal more or less parallel ridges.

ANDAMANS; very common in thickets near Port Blair; no doubt introduced. DISTRIE. Malay Archipelago.

This has the general habit of the common Indian O. sennoides, of which it is perhaps only a cultivated form; its pods, however, are much longer and are never muricated. The original description, it should be noted, was made from specimens cultivated at Buitenzorg.

# 36. ÆSCHYNOMENE Linn.

Erect herbs or undershrubs. Leaves with very numerous close

sensitive odd-pinnate small linear leaflets. Flowers in sparse racemes. Calyx deeply 2-lipped, the lips faintly toothed. Corolla fugacious; standard orbicular; keel not beaked. Stamens in two bundles of 5 each; anthers uniform. Ovary stalked, linear, many-ovuled; style filiform, incurved, stigma terminal. Pod linear, with a stalk longer than the calyx, and 4-8 flattened 1-seeded separating joints. Species about 30, spread everywhere in the tropics.

Stems woody, slender, much-branched; calyx and corolla small glabrous; pods narrow, smooth ... ... 1. ##. indica. Stems pith-like, stout, little-branched; calyx and large corolla hispid; pods broad, warted ... ... 2. ###. aspera.

1. ÆSCHYNOMENE INDICA Linn. Sp. Pl. 713. A slender, much branched annual undershrub, stems 1-3 feet high under 15 in. in diam. at base; everywhere glabrous, pale-green; branches slender twiggy terete. Leaf-rachis 2-3 in. long; leaflets close, terminal and in 20-30 opposite pairs, linear, obtuse, 1-nerved, 2 in. long; stipules lanceolate, 3 in. long, membranous, deciduous, with a large auricle. Racemes axillary 1-4fld.; peduncles 1 in. and pedicels 3 in., usually viscid; bracteoles small subulate glandular. Calyx 2 in., glabrous, teeth unequal the two upper subconnate, persistent, withering. Corolla pale-yellow, tinged with pink or orange, 45 in. long, glabrous, fugacious, standard orbicular emarginate. Stigma capitate. Pod 1-15 in long, straight or at times slightly curved, upper suture even, lower indented between the 8-10 separating smooth or faintly papillose joints 12-15 in. broad. DC. Prodr. II, 320; Mig. Flor. Ind. Bat. I, 274; Bak. in Flor. Brit. Ind. II, 151. Z. pumila Linn. Sp. Pl. ed. II, 1061; DC. Prodr. II, 321. Z. aspera Wall. Cat. 5666 not of Linn. E. diffusa Willd. Sp. Pl. III, 1164; DC. Prodr. II. 321; Wall. Cat. 5565. E. viscidula Willd. Enum. 776. E. Roxburghii Spreng. Syst. III, 322. Smithia aspera Roxb. Hort. Beng. 56; Flor. Ind. III, 343. Hedysarum Neli-Tali Roxb. Hort. Beng. 57; Flor. Ind. III, 365.

Andamans; Port Mouat, plentiful. Prov. Wellesley; Ridley 8009! Distrib. Tropics generally.

2. ÆSHYNOMENE ASPERA Linn. Sp. Pl. 713. A tall erect swampshrub reaching 10-12 feet in height, stems 3 in. or more in diam., externally glabrous, internally full of soft white pith; branches few or none. Leaf-rachis 3-6 in. long; leaflets terminal and in 30-50 opposite pairs, linear, obtuse, 1-nerved, '5 in. long; stipules lanceolate '5 in. long, auricled, deciduous. Racemes axillary corymbosely 2-4-fid.; peduncles 1 in. and pedicels '4 in. clothed with spreading bristles; bracteoles small ovate deciduous. Calyx '4 in., hispidly hairy, unequally 5-toothed, the two upper teeth subconnate. Corolla '75 in. yellow, fugacious, standard orbicular. Pod 2-2:5 in. long, '3 in. across, often indented on

both the echinulate sutures, always along the lower, between the 4-8 separating joints which are usually echinulate on the face, rarely smooth. DC. Prodr. II, 320; Miq. Flor. Ind. Bat. I, 275; Bak. in Flor. Britand. II, 152. Æ. indica Wall. Cat. 5667 not of Linn. Æ. trachyloba Miq. Flor. Ind. Bat. I, 276. Æ. indica VAR. aspera Hassk. Pl. Jav. Rar. 340. Hedysarum lagenarium Roxb. Hort. Beng. 57; Flor. Ind. III, 365.

MALACCA; Griffith! DISTRIB. Tropical S.-E. Asia and Tropical Africa.

This is the well-known "Sola" plant, the pith of which is used in making sun-hats, fishermen's floats and other articles where great lightness is desirable. Doubtless it is an introduced plant in Malacca.

#### 37. PHYLACIUM Benn.

Climbing herbs. Leaves 3-foliolate; stipules persistent small linear or lanceolate, leaflets stipellate. Flowers in axillary racemes shortly pedicelled, 2-bracteolate near the calyx, completely enveloped, as ultimately is the legume, in a large boat-shaped membranous accrescent bract. Calyx tubular, sub-2-labiate, 4-toothed. Standard ovate, apex retuse base 2-auriculate; wings oblong, long-spurred, spurs incurved clasped by the auricles of the standard; keel straight obtuse shortly spurred. Siamens diadelphous, posterior filament adnate to base of standard-claw. Ovary short-stalked, its base surrounded by a shallow disc; ovule solitary; style inflexed. Pod short-stalked ovate-rotund, acute. Species 2, the present and another which is Indo-Chinese.

Phylacium bracteosum Benn. Pl. Jav. Rar. 159 t. 33. A slender climber 20-30 feet long, young parts and leaves beneath sparingly adpressed-hirsute. Leaves pinnately 3-foliolate; leaflets ovate-oblong base rounded apex obtuse, thinly herbaceous, green on both surfaces, glabrous above, sparingly hirsute beneath, 2-3 in. long, 1.5 in. wide; petioles glabrescent 1.5 in. long, stipules and stipels linear, persistent. Racemes axillary 2-10 together, 1.5-2 in. long, shorter than the leaves, flowers fasciculate few. Bracts pale-green, 1-1.5 in. long, externally glabrous, sparing hirsute within. Calyx 15 in. long, externally sparingly hirsute, upper lip entire ovate, lower 3-lobed, lobes lanceolate the central rather the larger, none overlapping. Corolla 3 in. long, white with a pink tinge, glabrous. Pod 25 in. long, compressed, sparing hirsute, reticulate. Benth. Pl. Jungh. I, 231; Miq. Flor. Ind. Bat. I, 228.

Perak; near Gunong Pondo, in open jungle, 200-300 feet elev., Kunstler 8367! DISTRIB. Sumatra and Java to the Philippines.

## 38. URARIA Desv.

Suffruticose perennials. Leaves stipellate, with 1 to 9 leaflets. Flowers very numerous, minute, racemose. Calyx-tube very short; two

upper teeth short; three lower usually elongated, setaceous. Standard broad; wings adhering to the obtuse keel. Stamens diadelphous; anthers uniform. Ovary sessile or short-stalked, few-ovuled; style inflexed filiform, stigma terminal. Pod of 2-6 small turgid leseded indehiscent joints, often placed face to face. Species 15, S.-E. Asiatic.

Stems erect, heads long cylindric; upper leaves 5-9-foliolate, leaflets much longer than broad:—

Leaflets narrowly lanceolate, clouded above, pedicels clothed with short bristles, joints of pod polished glabrous ... 1. U. picta. Leaflets oblong, green above, pedicels clothed with long

bristles, joints of pod dull puberulous ....

Stems trailing heads short oblong; leaves 1-foliolate and 3-

foliolate intermixed, leaflets not much longer than broad ... 3. U. lagopoides.

U. crinita.

1. URARIA PICTA Desv. Journ. Bot. I, 123 t. 5 f. 19. An erect little-branched suffruticose perennial 3-6 feet high, with stout finely downy stems '5 in. or more in diam. at base. Leaves 10-12 in. long, rachis finely downy; leaflets terminal and in 2-4 opposite pairs, linearlanceolate, rigidly subcoriaceous, glabrous clouded with white above. finely reticulate veined and minutely pubescent beneath, 4-8 in. long ·3-·6 in. wide; petiole 2-2·5 in. long, stipules lanceolate long-acuminate from a broad base 5 in. long with parallel veins, stipels subulate 2 in. long; the lowest leaves simple or 3-foliolate, round or oblong. Racemes in dense cylindric heads 6-12 in. long, 65-75 in. broad; bracts brown scariose deciduous, upper lanceolate lower ovate-acuminate; pedicels 25-35 in. long, covered with short bristles, abruptly incurved at the tip after flowering. Calyx 2 in. long. Corolla purple, exserted, 3 in. long. Pod glabrous, pale lead-coloured, joints 3-6, smooth polished, 13 in. long 1 in. wide, compressed. DC. Prodr. II, 324; Wall. Cat. 5674; Miq. Flor. Ind. Bat. I, 267; Bak. in Flor. Brit. Ind. II, 155. U. linearis Hassk. Pl. Jav. Rar. 349. Hedysarum pictum Jacq. Ic. t. 567; Roxb. Hort. Beng. 57. Doodia picta Roxb. Flor. Ind. III, 368.

Perak; Scortechini! Prov. Wellesley; Ridley 6958! Nicobars; Kamorta, Kurz! Distrib. India; Indo-China; Malay Islands.

2. URARIA CRINITA Desv. Journ. Bot. I, 123. An erect little-branched perennial 3-8 feet high, with stout finely downy stems '75 in. or more in diam. at base. Leaves 8-15 in. long, rachis sparingly puberulous, leaflets terminal and in 2-3 opposite pairs, ovate-oblong acute, subcoriaceous, glabrous, green above, finely reticulate-veined and minutely tomentose beneath, 3-4 in. long, 1-1.5 in. wide, base rounded; petiole 3-4 in. long, stipules lanceolate acuminate '6 in. long, puberulous; stipels lanceolate '15 in. long; the lowest leaves simple or trifoliolate, ovate or subcordate. Racemes in dense cylindric heads 8-18 in. long, 1-1.5 in. broad; bracts scariose deciduous ovate-acuminate, ciliate;

pedicels 45-65 in. long, covered with long spreading bristles, abruptly incurved at the tip after flowering. Calyx '2 in. long, teeth sparingly plumose. Corolla pale-purple, '3 in. long. Pod puberulous, joints 4-6, black, dull, '13 in. long, '1 in. wide, compressed. DC. Prodr. II, 324; Wall. Cat. 5675; Miq. Flor. Ind. Bat. I, 268; Bak. in Flor. Brit. Ind. II, 155. U. camosa DC. Prodr. II, 324. U. picta Wight, Ic t. 411, not of Desv. Hedysarum crinitum Linn. Mant. I, 102; Burm. Flor. Ind. 169 t. 56; Roxb. Hort. Beng. 57. Doodia crinita Roxb. Flor. Ind. III, 369.

Pahang; Renchong, etc. Ridley! Perak; Thaipeng, Scortechini 71! Sunga Ryah, Kunstler 1011! Malacca; Maingay 527! Singapore; Hullett 49! Ridley 8110! Distrib. India, Indo-China, China, Malay Islands.

3. URARIA LAGOPOIDES DC. Prodr. II, 324. A tufted woody perennial with slender trailing pubescent much branched stems 1-3 feet long. Leaves 1.5-2 in., rachis pubescent; leaflets solitary, or a terminal and one pair of opposite leaflets, oblong rhomboid or rounded, base rounded trancate or at times cordate, thickly membranous, green glabrous above, finely reticulate-veined, pubescent beneath, 1-2 in. long: 75-1 in, wide; lateral pair of leaflets when present always much smaller than terminal: petiole .5-75 in.; stipules lanceolate .2 in.; stipels subulate small. Racemes in short dense simple oblong heads, 1-2.5 in. long, 8 in. wide; bracts subpersistent distinctly ciliated, 3 in. long; pedicels densely crinite, 15 in. long. Calya 12 in., lower teeth setaceous, densely plumose. Corolla pale-purple, 2 in. long. Pods glabrous, joints thick, reticulate, 15 in. long, 08 in. wide, compressed. Miq. Flor. Ind. Bat. I, 268; Bak, in Flor, Brit. Ind. 156. U. retusa Wall. Cat. 5680. Hedysarum lagopodioides Linn. Sp. Pl. 1198. H. lagopoides Burm. Fl. Ind. 68, t. 53, f. 2. Lespedeza lagopoides Pers. Synops, II, 308. Doodia lagopodioides Roxb. Flor. Ind.III, 366.

Pahang; Ridley 2594! Perak; Scortechini 13! Prov. Wellesley; Ridley 8010! Andamans; King's Collectors! Distrib. India; Indo-China; China; Malay Islands.

### 39. LOUREA Neck.

Herbs. Leaves membranous, stipellate, 1-3-foliolate. Flowers in terminal simple or panicled racemes. Cayla membranous, accrescent, the lanceolate teeth as long as the campanulate tube. Corolla equalling or exceeding the calyx; standard broad; keel obtuse. Stamens diadelphons; anthers uniform. Ovary few-ovuled; style filiform, inflexed, stigma capitate. Pod of about 4 small distinct 1-sceded smooth veined joints, included in the calyx. Species 4; all igin ly East Indian.

LOUREA VESPERTILIONIS Desv. Journ. Bot. I. 122, t. 5 f. 18. An erect slender herb, sparingly subfastigiately branched; branches towards their tips finely downy with hooked hairs. Leaf-rachis 5-1 in., leaflets usually 1 terminal, rarely 3; rigidly subcoriaceous, green usually clouded with white, the terminal one 2-3 in. broad, 3-5 in. long with two linear or lanceolate spreading or slightly ascending 2-3-nerved halves, apex of each lobe broadly emarginate bristle-tipped; lateral leaflets, when present, much smaller, obliquely obversely deltoid. Racemes simple or slightly panicled; 3-6 in. long; pedicels pubescent, shorter than calvx, the lower geminate. Calvx membranous campanulate; in fruit 25-35 in. long, sparsely pubescent with spreading hairs; teeth as long as tube, wide-triangular with a strong central nerve and widely reticulate-veined, as is the tube, with slightly weaker secondary nerves. Corolla not longer than calyx. Pod included, 4-5-jointed. DC. Prodr. II, 323; Wall. Cat. 5671; Miq. Flor. Ind. Bat. I, 264; Bak. in Flor. Brit. Ind. II, 154. Hedysarum Vespertilionis Linn. fil. Suppl. 331; Roxb. Hort. Beng. 57; Flor. Ind. III, 352.

MALAYAN PENINSULA; exact locality not given, Sir W. Norris! DISTRIB. Now cosmopolitan in the tropics, but often only planted.

# 40. ALYSICARPUS Neck.

Diffuse annuals or biennials. Leaves simple, rarely 3-foliolate, stipellate, subcoriaceous. Flowers in copious axillary racemes. Calyx glumaceous; teeth deep, often imbricated, the two upper often connate. Corolla not exserted; standard broad; keel obtuse, adhering to the wings. Stamens diadelphous; anthers uniform. Ovary nearly or quite sessile, many-ovuled; style incurved, stigma capitate. Pod terete or turgid, composed of several indehiscent 1-seeded joints. Species about 15; weeds, everywhere in the tropics of the old world.

ALYSICARPUS VAGINALIS DC.; Miq. Flor. Ind. Bat. I, 231. A robust ascending herb, stems 1-3 feet long (var. typica); or a dwarf diffuse herb with very slender stems and branches spreading 8-12 in. (var. nummularifolia); the branchlets slightly downy. Leaves always 1-foliolate, petioles 3 in. long, slender, glabrous, stipules subscarious parallel-veined ovate-acute half as long as petioles; leaflets glabrous cordate at base, lowest lanceolate 1.5-2 in. long, 5 in. broad acute, with upper oblong obtuse 1-1.5 in. long and 1 in. wide (in one series of forms); or lowest oblong .75 in. long subacute, the upper 5 in. long ovate-obtuse all 3 in. wide (in a second series of forms). Racemes 8-12-fld. lax-fld. 1-3 in. long (var. typica) or congested under 1 in. long (var. nummularifolia); pedicels shorter than calyx. Calyx .12 in. glabrescent, teeth linear-setaceous longer than tube. Corolla pale-yellow tinged with

pink, small, included. Pod terete, reticulate-veined, '5-'75 in. long, '08 in. wide; joints 6-8, half as long again as broad; faintly pubescent, slightly thickened at the ends. Bak. in Flor. Brit. Ind. II, 158.

VAR. typica. Stems stouter ascending, lower leaves usually lanceolate and upper oblong, occasionally lower leaves oblong and upper ovate, racemes lax. DC. Prodr. II, 353; W. & A. Prodr. 233. A. diversifolius Wall. Cat. 5772. A Harnieri Schweinf. Rel. Kotsch. 24 t. 19. Hedysarum vaginale Linn. Sp. Pl. 746; Roxb. Hort. Beng. 56; Flor. Ind. III, 345.

PANGKORE; Scortechini 1461! MALACCA; on Pulo Besai, Maingay 516! SINGAPORE; Changi, Ridley 1080!

Var. nummularifolia Miq. loc. cit.; Bak. loc. cit. Stems slender diffusely spreading, lower leaves always oblong, upper ovate, racemes dense. A nummularifolius DC. Prodr. II, 353; Wall. Cat. 5767; W. & A. Prodr. 133. A. varius Wall. Cat. 5768. Hedysarum nummularifolium Linn. Sp. Pl. 746. H. varium Roth. Nov. Sp. 351. H. cylindricum Poir. Encyc. Meth. Suppl. V, 400. Hegetschweilera pulchella Regel, Bot. Zeit. I, 47.

Andamans; Gt. Coco Isd. Prain! Port Blair, King! Perak; Scortechini! Ridley 8008! Penang; Water-falt, Curtis 1892! 1893! Malacca; King! Hervey! SINGAPORE; on Pulo Obin, Kunstler 4!

The writer has followed Miquel and Baker in uniting these two plants which Linnaus, De Caudolle, Wallich and Wight have endeavoured to keep distinct. The difficulty that has arisen in distinguishing them, has been due to the fact that A. vaginalis, though always diagnosed as having lower leaves lanceolate and upper leaves oblong, in reality very often has the lower oblong and the upper ovate as in A. nummularifolius. The true distinguishing characters are the spreading habit and condensed racemes of the variety, the ascending stems and lax racemes of the typical plant. The description and the varietal diagnoses now given may, it is hoped, prevent a recurrence of the difficulty that has hitherto been experienced in differentiating the two.

### 41. Desmodium Desv.

Herbs or shrubs. Leaves 1- or 3-foliolate, stipellate. Flowers small usually in copious often dense racemes. Calyx campanulate; teeth longer or shorter than the tube the two upper often subconnate. Corolla exserted; standard broad; wings more or less adherent to the usually obtuse keel. Upper stamen entirely or partially free from the other united 9. Ovary sessile or stipitate, few- or many-ovuled; style incurved, stigma minute capitate. Pod usually composed of several 1-seeded indehiscent joints, the faces compressed, the upper suture rarely finally splitting open, the joints usually separating. Species about 150; cosmopolitan in tropical and subtropical countries, a few in temperate N. America and temperate S. Africa.

Pod distinctly divided into several separating one-seeded joints:—		
Leaves 3-foliolate:—		
Small trailing herbs with 1-3 axillary flowers (1.		
Sagotia):—		
Pedicels hardly exceeding the petioles; leaflets		D 1-14
obovate-cuneate, truncate or emarginate	1.	D. triflorum.
Pedicels distinctly longer than petioles; leaflets	~	
oblong rounded at apex	2.	D. heterophyllum.
Undershrubs or shrubs with woody branches:-		_ 1
Bracts large, 2-foliolate, persistent (2. Phyllodium)	3.	D. pulchellum.
Bracts small. simple, decidnous:—		
Flowers in dense short-peduncled axillary umbels		
(3. Dendrolobium):—		
Leaflets smooth, veins beneath indistinct; pods		
glabrous	4.	D. umbellatum.
Leaflets rugose, reticulate-veined beneath;		
pods strigose	5.	D. rugosum.
Flowers in more or less elongated racemes:-		•
Lowest joint of pod distinctly stalked, constric-		
tions between joints reaching from lower almost		
to upper suture (4a. Eudesmodium § Podocar-		
pium)	6.	D. laxum.
Lowest joint of pod sessile:—	٥.	D. a.sum.
Joints of pod not manifestly longer than broad:—		
Joints of pod indehiscent, leaflets large	<b></b>	7 7 77
acuminate (4b. Eudesmodium § Dollinera)	7.	D. megaphyllum.
Joints of pod opening along lower suture,		
leaflets small (4c. Eudesmodium § Nichol-		
soniu):—		
Leaflets obovate-cuneate silvery beneath;		
pedicels always ultimately reflexed;		
stems prostrate	8.	D. capitatum.
Leaflets obovate-cuneate or obovate-		
acute, not silvery beneath; pedicels		
erect or ascending; stems erect	9.	D. polycarpum.
Joints of pod 4 times as long as broad (4d.		
Eudesmodium § Scorpiurus)	10.	D. laxiflorum.
Leaves 1-foliolate:-		
Petioles not winged :-		
Joints of pod 4 times as long as broad (4d.		
	11.	D. ormocarpoides.
Joints of pod not manifestly longer than broad		
(4e. Eudesmodium § Heteroloma):—		
	12.	D. gangeticum.
	13.	
Petioles broadly winged (5. Pteroloma):—	TO.	D. vargavam.
	14	D tuinuatuur
	14.	D. triquetrum.
134		* 11

... 15. D. auriculatum. Pods coriaceous, quite glabrous Pods indistinctly jointed, not separating into segments but dehiscing in a continuous line along the ventral ... 16. D. gyroides. suture (6. Pleurolobium)

Subgen. 1. Sagotia Walp. Trailing herbs, with small 3-foliolate stipellate leaves. Flowers in sparse lax racemes or 1-2 in the axils of

the leaves; bracts deciduous and pods distinctly jointed.

1. Desmodium Triflorum DC. Prodr. II, 334. A small trailing herb with very slender diffusely branching stems 6-18 in. long; branches sparsely hirsute with fine spreading hairs. Leaves 5 in. long, 3-foliolate; petiole 2 in. long; leaflets membranous obovate-cuneate, apex truncate or emarginate, terminal 25 in. long 2 in. across, lateral ·2 in. long ·15 in. across, glabrous above sparsely adpressed-hirsute heneath: stipels minute subulate, stipules persistent lanceolate 15 in. long. Inflorescence of 1-3-fid. axillary fascicles; pedicels 25 in., bracteoles minute. Calyx pubescent with longish white hairs 1-15 in. long: teeth setaceous longer than narrowly campanulate tube. Corolla pink or occasionally white 2 in. long. Pod 4-6 in. long, 15 in. wide; joints 3-5, reticulately veined and finely puberulous; upper suture straight, lower distinctly indented between the joints. Wall. Cat. 5734 (except part of F.); Benth, in Mart. Flor. Bras. XV, 95, t. 26; Mig. Flor. Ind. Bat. I, 238; Bak. in Flor. Brit. Ind. II, 173. D. triflorum VAR. minus W. & A. Prodr. 229; Wight Ic. t. 292. D. heterophyllum Wall. Cat. 5701 C. Hedysarum triflorum Linn. Sp. Pl. 749; Roxb. Hort. Beng. 57; Flor. Ind. III, 353. H. stipulaceum Burm. Flor. Ind. t. 54, f. 2. Nicholsonia reptans Meissn. in Linnaea XXI, 260. Sagotia triflora Walp. & Duch. in Linnaea XXIII, 738.

Andamans; Port Blair, Kurz! Prain! Great Coco Island (specns. all white-fld.) Prain! MALACCA; Maingay 522! PROV. WELLESLEY; King! PENANG; Wallich 5734 I! DISTRIB. Cosmopolitan in the tropics.

An extremely common species in India, not so common in Indo-China; very rare, perhaps only a recently introduced weed, in Malaya.

2. Desmodium heterophyllum DC. Prodr. II, 334. A trailing herb with slender diffusely branching stems 2-2.5 feet long; branches densely hirsute with spreading hairs. Leaves 1-1.5 in. long, 3-foliolate, petiole 5 in, long; leaflets membranous oblong or obovate-oblong apex rounded or subacute, terminal 5-1 in. long, 3-5 in. wide, lateral similar 25-5 in. long 2-25 in. wide, glabrous above, hairy beneath; stipels minute subulate, stipules persistent lanceolate 15 in, long. Inflorescence of solitary or geminate axillary flowers and, towards ends of branches, of a few axillary lax few-fld. racemes; pedicels 5-8 in. long, sparsely pubescent with rusty spreading hairs; bracts 2 in. long, ovatelanceolate, deciduous, bracteoles minute. Calyx 15 in. densely hirsute,

teeth setaceous, longer than narrowly campanulate tube. Corolla pale-purple, 25 in. long. Pod 5-75 in. long, 18 in. wide; joints 4-5, reticulate, glabrescent except the lower suture, dehiscent; upper suture straight lower distinctly indented between the joints. Wall. Cat. 5701, letters A. B. D.; Miq. Flor. Ind. Bat. I, 238; Bak. in Flor. Brit. Ind. II, 173. D. cæspitosum DC. Prodr. II, 333. D. triflorum Wall. Cat. 5734, letter F. in part. D. triflorum VAR. majus W. & A. Prodr. 229; Wight, Ic. t. 291. Hedysarum heterophyllum Willd. Sp. Pl. III, 1201. H. reptans Roxb. Hort. Beng. 57; Flor. Ind. III, 354. Dicerma repens Grah. in Wall. Cat. 5740.

In all the provinces, very common. DISTRIB. Throughout tropical S.-E. Asia.

Though very like the preceding this is quite easily distinguished by its thicker stems, larger and differently shaped leaflets, much longer pedicels and rather broader pods, the joints of which usually dehisce along the lower suture.

The distribution in India and Malaya of these two species, is reversed. In India this is quite a rare plant, D. triflorum being common everywhere; in Malaya, on the other hand, D. triflorum is very rare while D. heterophyllum is extremely common and is apparently the representative of the other.

Subgen. 2. Phyllodium Desv. Shrubs with woody branches and 3-foliolate leaves. Flowers umbellate, the umbels in long continuous rows, each hidden by a pair of persistent bracts.

3. Desmodium pulchellum Benth. ex Bak, in Flor. Brit. Ind. IL 162. A small shrub 4-5 feet high with slender terete finely greydowny branches. Leaves 5-6 in. long, 3-foliolate, petiole 25-4 in., channelled above, downy; leaflets coriaceous green subrugose above, finely downy beneath, narrow-ovate to ovate-lanceolate subacute, terminal 3-4 in. long 1.5 wide, on petiolules 6 in. long; lateral pair much smaller, 1.25 in, long, 75 in, wide, petiolules 15 in, long; lateral nerves 10-12 pairs, very oblique distinctly raised beneath, secondary reticulate crossvenation visible; stipels subulate as long as petiolules, stipules 25 in. long subscarious closely parallel-veined, subpersistent. axillary or terminal, 3-10 in. long, in racemes of solitary flowers, fascicles, or small subumbellate corymbs, in the axils of 12-40 compound foliar bracts; bracts 2-foliolate, their stipules 2 in. and petiole 15 in. long, leaflets opposite subobliquely orbicular 5 in. across, glabrous externally, finely downy internally, on very short stipellate petiolules, their terminal leaflet reduced to a bristle 2-25 in. long; fascicles or close-set corymbs 2-6-fld.; pedicels slightly unequal, 08-10 in., downy. Calyx 1 in. puberulous, teeth lanceolate shorter than tube. Corolla 25 in. yellow. Pod 2-3 in. long indented on both sutures slightly puberulous; joints 2, less often solitary, very rarely 3, 1 in. loug, 12 in. broad. Hedysarum pulchellum Linn. Sp. Pl. 747; Roxb. Flor. Ind. III, 361.

Zornia pulchella Pers. Synops. II, 318. Dicerma pulchellum DC. Prodr. II, 339; Wall. Cat. 5737; Wight, Ic. t. 418. Phyllodium pulchellum Desv. Journ. Bot. III, 123, t. 5, f. 24; Benth. Pl. Jungh. 217; Miq. Flor. Ind. Bat. I, 260.

MALACCA; Griffith. PAHANG; Ridley 2596! JOHORE; Kunstler 376!

PERAK ; Scortechini !

Subgen. 3. Dendrolobium W. & A. Shrubs with woody branches and 3-foliolate leaves. Flowers in dense short-peduncled or sessile

axillary umbels, bracts minute deciduous.

4. Desmodium umbellatum DC. Prodr. II, 325. A littoral shrub 5-15 feet high with densely downy terete young branches. Leaves 5-7 in. long, 3-foliolate, petiole 1 in. long, channelled above, rusty-puberulous; leaflets subcoriaceous, green glabrous above, paler and thinly causement underneath, ovate-oblong obtuse or rarely acute or subacute, terminal 3-3.5 in. long, 2-2.5 in. wide on a petiolule 5 in. long, the lateral pair similar but smaller 2-2.5 in. long, 1.25-1.75 in. wide on petiolules ·2 in. long; lateral nerves 6-8 pairs hardly raised beneath; stipels very small, subulate, half as long as petiolules; stipules large 3 in. long, subscarious, closely parallel-veined, caducous with the unfolding of leaf next above which they cover in bud. Inflorescence axillary, with peduncles 35 in. long, in 6-12-fld. corymbs simulating umbels; pedicels short 15 in. or less, elongating in fruit to 25 in., unequal, very close-set. Calyx with a broad scarious deciduous bracteole, '1 in. long '07 in. wide, at its base, densely silky externally, 15 in. long, teeth lanceolate, as long as tube. Corolla 5 in long, white. Pod 1.5-2 in long, joints 4, very rarely 5, 3 in. long, 25 in. wide, sparsely silky when young, glabrous when ripe, thick and coriaceous almost turgid. W. & A. Prodr. 224; Wall. Cat. 5687; Bak. in Flor. Brit. Ind. II, 161. Dendrolobium umbellatum Benth. Pl. Jungh. 218; Miq. Flor. Ind. Bat. I, 262. Hedysarum umbellatum Linn. Sp. Pl. 747. H. arboreum Roxb. Flor. Ind. III, 360.

In all the provinces, common on the coasts. DISTRIB. On all coasts from the Mascarene Islands to Polynesia.

A curious variety of this species, with branches, leaves beneath, and ripe pods softly silky, is van. hirsutum DC. It is known only from specimens cultivated in Hort. Calcutta (Wall. Cat. n. 5687/D) and in Hort. Bogor.—the Buitenzorg specimens being marked "E horto Calcuttensi recepta." The original habitat of this variety is unknown.

D. umbellatum has been said to occur in Upper Burma; this is a mistake caused by Dr. Wallich having issued (as 5687/\$) a totally different species under the same name. No one has ever sent specimens of D. umbellatum to Calcutta except from sea-coasts and the shores of tidal rivers.

5. Desmodium Rugosum Prain. A large gregarious shrub with

rusty-puberulous angular young branches. Leaves 5-7 in. long, 3foliolate, petiole 1 in. long, channelled above, rusty-puberulous; leaflets coriaceous rugose, puberulous on the midrib and nerves above, densely rusty-puberulous beneath on the midrib lateral nerves and secondary veins: obovate-acute, terminal 4 in. long 25 in. wide, on a petiolule 5 in. long; lateral pair oblong-acute base obliquely rounded, 3.5 in. long 1.75-2 in. wide, on petiolules 15 in. long; lateral nerves 10-12 pairs very prominent beneath as is the close reticulate secondary venation; stipels subulate, '12 in., nearly as long as petiolules; stipules subscarious caducous. Inflorescence axillary, with peduncles 25 in. long, in 3-6-fld. corymbs simulating umbels but with the rachis produced for 3 in. or more in the centre and marked by numerous closeset scars left by fallen pedicels; pedicels that persist 2 in. long, elongating slightly in fruit. Calyx with a broad scarious deciduous bracteole 'l in. long at its base, pubescent externally, '2 in. long, teeth longer than tube. Corolla 5 in. long, white. Pod 1.5 in. long, joints 4, 3 in. long 25 in. wide, densely adpressed-pubescent with coarse rusty hairs, thick, coriaceous, almost turgid.

KEDAH; Langkawi, Curtis 2550! DISTRIB. Tenasserim.

Very nearly related to the preceding species but with quite different foliage and pods. Very nearly related also to D. Wallichii (D. umbellatum Wall. Cat. n. 5687 letter B only) from Upper Burma, but with larger pods, and coarser, more rugose acute leaves than in that species; indeed, D. Wallichii with the inflorescence of D. rugosum has foliage more resembling that of D. umbellatum. The stipules of D. Wallichii do not fall immediately after the unfolding of the leaf next above, as in the case of D. umbellatum and D. rugosum.

Desmodium (Dendrolobium) Cephalotes Wall. is stated by Dr. Miquel to occur in Java. No Malayan specimens of the species, which is very common throughout India and Indo-China, have yet reached Calcutta. Its presence, however, would not be surprising and the species should be looked for by collectors in the Malay Peninsula.

Subgen. 4. Eudesmodium. Erect herbs or undershrubs with large 1-3-foliolate leaves. Flowers often 2 or several from a node in long racemes simple or panicled, bracts deciduous and pods distinctly jointed.

§ PODGGARPIUM Bth. Joints of pod indehiscent, longer than broad, the lowest one distinctly stalked, constrictions reaching from lower nearly to straight upper suture.

6. Desmodium Laxum DC. Prodr. II, 336. A bush 2-4 feet high with angular erect finely-puberulous branches. Leaves 5-8 in. long, 3-foliolate, petiole 1-2.5 in., channelled above, finely sparsely puberulous; leaflets membranous, green and glabrous above, paler and sparsely hirsute on the nerves beneath, terminal narrow ovate, 4-6 in. long 1.5-2 in. wide, narrowed gradually to apex, cuneate at base on a petiolule 75 in.

long, lateral nerves 3 pairs the lowest much stronger than the rest and very oblique; side leaflets similar but smaller, 3-4 in. long 1-1.5 in. wide, with slightly oblique bases; stipels subulate 2 in. long; stipules linear-lanceolate 5 in. long, persistent. Inflorescence in rather narrow terminal and axillary racemes, the former sometimes paniculate, 12-20 in. long, composed of as many distant solitary flowers or few-fid. fascicles, bracts minute linear; pedicels puberulous slender 2 in., ultimately spreading 4 in. long. Calyx very small 08 in. long, tubular, slightly pubescent, teeth deltoid very short. Corolla pink, 25 in. long. Pod 1-3 in. long, the lowest joint on a stalk 3 in. long, joints few indehiscent 5 in. long, 2 in. wide, the constrictions nearly reaching the upper suture, cut obliquely from opposite the point to the base. D. Gardneri Bth. Pl. Jungh. 226; Miq. Flor. Ind. Bat. I, 255; Bak. in Flor. Brit. Ind. II, 165. D. podocarpum Miq. Ann. Must. Lugd. Bat. III, 46 not of DC.

PERAK; on Ulu Batang Padang, Wray 1608! DISTRIB. India;

Himalayas; Indo-China; China; Malay Archipelago.

§ DOLLINERA Endl. Joints of pod indehiscent, hardly longer than broad, upper suture straight or slightly indented; calyx teeth not exceeding tube.

7. Desmodium megaphyllum Zoll. Nat. en Geneesk. Arch. III, 58. A straggling shrub 8 feet high with slightly grooved, blackish branches, with a sparse short tomentum. Leaves 7-9 in. long, 3-foliolate, petiole 2-2.5 in, channelled above, sparsely tomentose; leaflets subcoriaceous. green sparsely puberulous above, grey thickly softly woolly beneath: rhomboid ovate-acuminate terminal cuneate at base, 4-6 in. long, 2.5-3.5 in, wide, on petiolule 1-15 in. long; lateral pair similar but smaller 3-4 in. long, 1.5-2.5 in. wide with obliquely rounded base; lateral nerves 5-6 pairs very oblique; stipels linear 25 in. long; stipules subscarious 15 in. long, lanceolate. Inflorescence longer than the leaves. in axillary and terminal racemes, the latter sometimes panicled, 8-10 in. long, of 25-30 few-fld. fascicles; pedicels slender 4 in. long, bracts 5 in. long, subscarious, lanceolate, bracteoles minute subulate. Calux campanulate 15 in. long, teeth triangular as long as tube. Corolla paleviolet, 3 in. long. Pod dull-crimson, 2-2:25 in., 6-8-jointed, joints .25 in. long '2 in. wide, indehiscent, slightly puberulous, finely reticulateveined, slightly indented on the lower suture. Miq. Flor. Ind. Bat. I. 245, excluding synonyms.

PERAK; upper part of Batang Padang Valley, at 2,000 feet, Wray 1441! DISTRIE. Java, Tenasserim.

§ NICHOLSONIA DC. Joints of pod dehiscent along lower suture, not longer than broad; upper suture straight, lower slightly indented.

8. Desmodium capitatum DC. Prodr. II, 336. A prostrate under-

shrub with elongated woody rounded branches, hoary-tomentose towards their tips, sometimes reaching 6 feet in length. Leaves 2-2.5 in. long. 3-foliolate, petiole 6 in. long slightly grooved and glabrescent above. adpressed-tomentose beneath; leaflets subcoriaceous, green glabrescent above, densely white-silky pubescent beneath; obovate-cuneate apex rounded, terminal 1.25 in. long, 1 in. across, lateral similar but smaller ·75 in. long, ·5 in. across, lateral nerves about 8 pairs slightly visible beneath; stipels subulate 1 in. long, stipules linear 25 in. long. Inflorescence of dense axillary and terminal subsessile racemes 1-2 in. long; pedicels 2-25 in., abruptly reflexed in fruit; bracts small ovate. cuspidate ciliate, bracteoles minute. Calya 1 in., glabrescent, teeth setaceous longer than tube. Corolla purplish-red, 2 in. long. Pods faintly puberulous, 5-75 in. long 15 in. wide; joints 6-8, dehiscent along lower indented suture. Miq. Flor. Ind. Bat. I, 241; Bak. in Flor. Brit. Ind. II, 170. D. obovatum Wall. Cat. 5722 B. D. polycarpum W. & A. Prodr. 227, in part. Hedysarum capitatum Burm. Fl. Ind. 167. t. 64, f. 1. H. conicum Poir. Encyc. Meth. VI, 419. Pseudarthria capitata Hassk. Pl. Jav. Rar. 390,

Perak; Durian, S. Batang, Kunstler 361! Thaipeng, Scortechini! Pahang; Palan Tawa, Ridley 2598a!

9. Desmodium polycarpum DC. Prodr. II, 334. An erect or suberect undershrub or shrub 2-5 feet high with woody angular slender branches shortly tomentose towards their tips. Leaves 2-4 in. long, 3. foliolate, petiole '6-1 in. long, slightly grooved glabrous above, sparsely adpressed-pubescent beneath; leaflets subcoriaceous, pale-green glabrous above, thinly adpressed-hirsute beneath, usually obovate-cuneate apex round, sometimes ovate-acute (D. ovalifolium Wall.), 1.25-3 in. long 1-1.5 in. across, lateral similar but smaller, .75-1.25 in. long .5-.75 in. across, lateral nerves about 6 pairs indistinct; stipels subulate 2 in. long, stipules linear 3 in. long. Inflorescence of dense axillary and terminal subsessile racemes 1-4 in. long; pedicels 2 in. long ascending; bracts ovate-cuspidate ciliate 25 in. long, bracteoles minute. Calyx 1 in., glabrescent, teeth setaceous longer than tube. Corolla pinkish-purple, 2 in. long. Pods usually faintly or (D. ovalifolium) densely ciliate, 5-75 in. long. 15 in. wide; joints 6-8, dehiscent along lower indented suture. W. & A. Prodr. 227; Wight Io. t. 406; Miq. Flor. Ind. Bat. I, 242; Bak. in Flor. Brit. Ind. II, 171. D. angulatum Wall. Cat. 5727 in part, not of DC. D. siliquosum DC. Prodr. II, 336. D. heterocarpum DC. Prodr. II, 337. D. retusum G. Don, Gen. Syst. II, 297. D. gyroides Hassk. Pl. Jav. Rar. 362, not of DC. D. Buergeri Miq. Ann. Mus. Lugd. Bat. III, 45. D. nervosum Vogel, Pl. Meyen, 28. D. patens Wight Ic. t. 407. Hedysarum polycarpum Lamk. Ill. t. 628. H. siliquosum Burm. Fl. Ind. 169, t. 55, fig. 2. H. heterocarpon Linn Sp. Pl. 747. H. purpureum Roxb. Hort. Beng. 57; Fl. Ind. III, 358. H. retusum Don Prodr. 243. H. patens Roxb. Fl. Ind. III, 362.

Var. typica; leaves obovate-cuneate rounded at apex; pods faintly puberulous.

In all the provinces, extremely common. DISTRIB. East Africa, India, Malaya, Indo-China, China, Polynesia.

Var. ovalifolia; leaves ovate-acute base rounded or truncate; leaflets beneath sometimes softly silky; pods pubescent with spreading hairs. D. ovalifolium Wall. Cat. n. 5730.

PENANG; Wallich! PERAK; Goping, Kunstler 1007! DISTRIB. Sumatra (Forbes n. 1256!)

There are several more or less distinct forms of *D. polycarpum* most of which are readily recognisable, though all are connected with each other and with typical *D. polycarpum* by means of many intermediates. The form here defined as VAR. ovalifolia has no intermediates, however, and so far as material hitherto collected goes, might even be treated as a separate species. But its habit and its flowers are so exactly those of *D. polycarpum* that it seems better to consider the differences of leaves and fruit as merely varietal.

§ Scorfiurus Bth. Joints of pod indehiscent much longer than broad constricted along both sutures.

10. Desmodium Laxiflorum DC. Prodr. II, 335. An erect undershrub 2-5 feet high with woody slender obtusely angled stems, at first densely clothed with short hairs at length glabrescent. Leaves 6-20 in. long, 3-foliolate, petiole 1.5-2.5 in., pubescent with adpressed hairs. grooved above; leaflets membranous or subcoriaceous, green and glabrous above, sparsely adpressed-hirsute beneath, terminal ovate-acute base rounded or cuneate, 4-6 in. long 1.5-3 in. across with petiolule 1 in. long. lateral nerves prominent beneath 7-10 pairs; lateral leaflets similar but smaller 1.5-2.5 in. long, 1-1.5 in. wide, base obliquely rounded. petiolule very short; stipels subulate 2 in. long; stipules ovate longacuminate, 3 in. long. Inflorescence in axillary and terminal racemes 6-10 in. long, of 12-20 distant solitary flowers or few-fld. fascicles; bracts and bracteoles minute linear or setaceous; rachis puberulous with adpressed hairs as are the ultimately patent pedicels 2-25 in. long. Calyx '1 in., pubescent, tube campanulate, teeth lanceolate as long as tube. Corolla white, 2 in. long. Pod 1-1.75 in. long, pendulous, 1 in. wide, joints 3 in. long, indehiscent, hardly constricted at the sutures and not ribbed, closely beset with short hooked hairs. Miq. Flor. Ind. Bat I, 251; Bak. in Flor. Brit. Ind. II, 164. D. bicolor Wall. Cat. 5719. D. elongatum Wall. Cat. 5715. D. leptostachyum Wall. Cat. 5697 B. D. sulcatum Wall. Cat. 5736. D. recurvatum Grah. in Wall, Cat. 5717; W. & A. Prodr. 226; Wight Ic. t. 374. D. diffusum DC. Prodr. II, 335, non 336. Hedysarum recurvatum Roxb. Hort. Beng. 57; Fl. Ind. III, 358; Wight, Ic. t. 409. H. diffusum Roxb. Fl. Ind. III, 357, not of Willd. H. Roxburghii Spreng. Syst. App. 292. H. Rottleri Spreng. Syst. III, 320.

Andamans; Great Coco, Prain! NICOBARS; Kondil, Kurz! DISTRIB.

Throughout India, Indo-China and Malaya.

11. Desmodium ormocarpoides DC. Prodr. II, 327. An erect undershrub 2-5 feet high with woody slender obtusely angled stems, at first densely clothed with short hairs at length glabrescent. Leaves 5-7 in. long, 1-foliolate, petiole '75 in. long, pubescent with spreading hairs, channelled above; leaflet subcoriaceous, green and glabrous above, sparsely pubescent to closely silky beneath, ovate-acute, base rounded or truncate, 4-6 in. long 1.5-2.25 in. wide, lateral nerves 6-8 pairs visible beneath; stipels subulate, 2 in. long; stipules ovate long-acuminate scarious, 3 in. long, subpersistent. Inflorescence in terminal or rarely axillary racemes 6-10 in. long, of 12-20 distant solitary flowers or few-fld. fascicles; bracts and bracteoles minute linear or setaceous; rachis puberulous with rusty tomentum as are the ultimately patent pedicels 25-35 in. long. Calyx 'l in. pubescent, tube campanulate, teeth short deltoid. Corolla white, 2 in. long. Pod 3-4 in. long, pendulous, 15 in. wide; joints 6-8, 6 in. long, indehiscent, constricted at both sutures, longitudinally ribbed, closely beset with short hooked hairs. Miq. Flor. Ind. Bat. I, 249; Bak. in Flor. Brit. Ind. II, 164. Hedysarum adhaerens Poir. in Lamk. Encyc. Meth. V, 15 not of Vahl. H. ormocarpoides Desv. ex DC. Prodr. II, 327. Rumph. Herb. Amboin. VI, t. 66.

VAR. velutina; leaves softly silky beneath. D. zonatum Miq. Flor. Ind. Bat. I, 250.

Andamans; common in the interior of the Islands. Selangor; Ridley 7295! Pahang; Kwala Tembeling, Ridley 2605! DISTRIB. Java.

The typical form of this species has leaves very sparsely hairy beneath; it occurs in Java (fide De Candolle), and is common in India from Ceylon and the Pulney Mts. northwards to Assam.

§ HETEROLOMA Bth. Joints of pod indehiscent, hardly longer than broad; upper suture straight or slightly indented; calyx-teeth exceeding tube.

12. Desmodium gangeticum DC. Prodr. II, 327. A slender undershrub 1-4 feet high with woody obtusely angled glabrescent stems and angled adpressed-puberulous branches. Leaves 4-6 in. long, I-foliolate, petiole 75 in. long channelled and with a few adpressed hairs above; membranous or rarely subcoriaceous, green and glabrous above, a little paler adpressed-puberulous beneath; ovate-acute, base rounded or truncate, 3-5-5 in. long 1-2 in. wide, lateral nerves 8-9 pairs slightly

visible on both surfaces, cross-nervation slightly visible beneath; stipels subulate 2 in. long; stipules linear subpersistent 25 in. long. Inflorescence in copious ascending terminal and axillary racemes 6-12 in. long, of 30-40 rather close-set few-fld. fascicles; bracts and bracteoles minute setaceous; rachis adpressed-puberulous as are the fastigiate pedicels 2-25 in. Calya finely pubescent, 08 in., teeth lanceolate longer than campanulate tube. Corolla white, 15 in. long. Pod subfalcate, 5-75 in. long, 1 in. across, 6-8-jointed, indented on upper suture, joints indehiscent slightly longer than broad, minutely puberulous with hooked hairs. Wall. Cat. 5689; Miq. Flor. Ind. Bat. I, 247; W. & A. Prodr. 225; Wight, Ic. 271; Bak. in Flor. Brit. Ind. II, 168. D. latifolium Wight. Ic. t. 272 not t. 270. Hedysarum gangeticum Linn. Sp. Pl. 746; Roxb. Flor. Ind. III, 349. H. collinum Roxb. Flor. Ind. III, 349.

Penang; Pinara Bukit, Curtis 2771! NICOBARS; Teressa, etc., Jelinek 233! King's Collectors!

13. Desmodium virgatum Zoll. Nat. en Geneesk. Arch. III, 58. A slender undershrub 1-4 feet high with angled adpressed-pubescent stems and branches. Leaves 4-6 in. long, 1-foliolate, petiole '25 in. long channelled above, densely rusty-tomentose; membranous or subcoriaceous, pale-green glabrous above, adpressed-puberulous beneath; ovateacute, base rounded or truncate, margin slightly sinuate, 3-5 in. long 1-2 in. wide, lateral nerves 8-9 pairs slightly visible on both surfaces; stipels subulate '2 in. long; stipules short triangular, '15 in. long. Inflorescence in copious ascending terminal and axillary racemes 3-8 in. long, of 20-30 close-set few-fld. fascicles; bracts and bracteoles minute setaceous, rachis densely rusty-tomentose; pedicels very short, '08 in., glabrescent. Calyx glabrescent, '08 in., teeth lanceolate longer than campanulate tube. Corolla pale-pink, 2 in. long. Pod subfalcate, 5-75 • in. long, '1 in. across, 6-8-jointed, indented or upper suture, joints indehiscent as long as broad, densely clothed with short hooked hairs. Zoll., Flora (1847) 697. D. latifolium VAR. virgatum Mig. Flor, Ind. Bat. I, 247. D. gangeticum var. acuminatum Miq. Flor. Ind. Bat. I, 248. D. latifolium Bak. in Flor. Brit. Ind. II, 168, in part, hardly of DC.

Perak; Batu Kuran, Scortechini 1594! Distrib. Chittagong, Burma, Java.

This has the habit and foliage of *D. gangeticum*, but in flowers and especially in fruits, it more resembles *D. latifolium* to which indeed Miquel and Baker have referred it.

Subgen. 5. Pteroloma Desv. Shrubs with 1-foliolate leaves and winged petioles. Flowers racemose, bracts minute and keel acute.

14. Desmodium triquetrum DC. Prodr. II, 326. A shrub with

grooved triangular glabrescent branches. Leaves 5-6 in. long, 1-foliolate: petiole 1 in. long 3 in. wide, with broad leafy reticulate-veined wings: blade 4-5 in. long '75-1 in. wide, narrowly oblong-lanceolate with rounded or subcordate base and acute apex, green and glabrous on both surfaces, lateral nerves 15-20 pairs and secondary cross reticulate venation distinct on both surfaces especially beneath; stipules very large, 5-75 in. long 2 in. wide, subscarious, closely parallel-veined persistent, stipels small adnate to upper margin of petiolar wing. Inflorescence in narrow axillary and terminal racemes 6-10 in. long, of solitary or fascicled flowers in the axils of 20-40 simple scarious bracts resembling foliar stipules with similar but much smaller stipulets at their base; pedicels ascending 2-3 in long. Calyx 15 in long, very sparsely hairy, bracteolate at base, bracteoles narrow scarious linear; tube campanulate, teeth unequal, upper deltoid lower linear. Corolla purple, 3 in. long. Pod 1-2 in. long, joints 6-8, thin, 2 in. long, 25 in. wide, densely persistently strigose with subadpressed greyish-brown hairs. Bak. in Flor. Brit. Ind. II, 163 in part only, the synonyms D. alatum, D. auriculatum and D. pseudo-triquetrum excluded. Hedysarum triquetrum Linn. Sp. Pl. 746. H. alatum Roxb. Flor. Ind. III, 348. Pteroloma triquetrum Benth. Pl. Jungh. 220; Miq. Flor. Ind. Bat. I, 258 excluding the synonyms Desmodium pseudo-triquetrum and D. alatum.

Andamans; common in the interior of the Islands. Perak; Kunstler 1074! Scortechini! DISTRIB. India and Indo-China.

This species is very easily recognised by its hairy pods. Some difficulty is at times found in separating flowering specimens of this from flowering specimens of the next species; the two are however quite distinct. Equally distinct are two other species, D. alatum and D. pseudo-triquetrum, quite justly differentiated by De Candolle but merged in D. triquetrum by Miquel, who has been followed in the Flora of Brit. Ind.

15. Desmodium auriculatum DC. Prodr. II, 326. A littoral shrub with grooved triangular glabrescent branches. Leaves 4-5 in. long, 1-foliolate, petiole 1 in. long '3 in. wide, with broad leafy reticulate-veined wings; blade 3-4 in. long 1-1.5 in. wide, oblong or ovate-acute with truncate or cordate base and acute apex, green and glabrous on both surfaces, lateral nerves 10-12 pairs and secondary cross reticulate venation distinct on both surfaces, especially beneath; stipules large '5 in. long '2 in. wide, subscarious, closely parallel-veined, persistent, stipels adnate to tip of petiolar wing. Inflorescence in axillary and terminal racemes 5-8 in. long, of solitary or fascicled flowers in the axils of 12-20 simple scarious bracts; pedicels ascending, '3 in. long. Calyx '15 in. long, sparsely hairy, base bracteolate; tube campanulate shorter than the unequal teeth. Corolla purple, '3 in. long. Pod 1-2 in. long,

joints 6-8 stoutish coriaceous, 25 in. long 3 in. wide, quite glabrous, polished. D. triquetrum Bak. in Flor. Brit. Ind. II, 163 in part, not of DC. Pteroloma auriculatum Miq. Flor. Ind. Bat. I, 258.

Andamans; coasts of Great Coco, Prain! of South Andaman, Playfair! Kurz! Prain! DISTRIB. Indo-China; Malay Archipelago.

Though common in Tenasserim where it has been collected by Wallich (n. 5788 M!) and Helfer (n. 1648!) as well as in Mergui where it has been obtained by Griffith (n. 568!) and Proudlock (n. 14!), this is not present in Calcutta from any locality within the Straits Settlements. It is rather more closely related to Desmodium alatum, which has broader pods, than to the preceding species, but it is equally distinct from both. It appears to be an almost exclusively littoral form; there are however two inland gatherings at Calcutta, both from Silhet and both collected by Mr. Clarke (n. 14352! and n. 42702!).

It should be noted that Hedysarum alatum Roxb. is not the species described by De Candolle as Desmodium alatum; Roxburgh's H. alatum is exactly equivalent to Linnaeus' H. triquetrum. Roxburgh's H. triquetrum on the other hand is not Linnæus' plant but is Desmodium pseudo-triquetrum DC., a species confined to Northern India, the lower Himalayan slopes, and the mountains of Assam. D. alatum DC., the plant with broad pods described in the Prodromus, occurs in Khasia, Cachar and Chittagong without appearing in India proper or in Burma and the Malay Peninsula; it recurs, however, in Java. The present species, D. auriculatum, has not been found in Java but is met with again in Timor.

SUBGEN. 6. PLEUROLOBIUM DC. Erect undershrubs, with large leaves. Flowers racemose; pods indistinctly jointed, debiscing in a continuous line along the ventral suture,

16. DESMODIUM GYROIDES DC. Prodr. II, 316. A shrub about 10 feet high with terete sparsely pubescent branches. Leaves 2:5-3 in. long 3- or often only 1-foliolate, petiole '75 in, long, slender glabrescent: leaflets membranous, oblong or ovate-oblong obtuse, pale-green glabrous above, very thinly adpressed-pubescent beneath, 1.75-2 in. long, 1-1.25 in. wide, lateral nerves 6-8 pairs visible beneath; lateral leaflets if present similar but much smaller, 5 in. long, 4 in. wide. Inflorescence in dense axillary and terminal at first strobilate racemes, with large imbricating scarious soon deciduous ovate-acute bracts, '25 in. long '2 in. wide, pedicels finely-pubescent at length patent, 25 in. long. Calyx 1 in., wide-campanulate, teeth triangular half as long as tube. Corolla :35 in long, 2 in across, purple. Pod 1-15 in long, 2 in wide, falcate; joints 6-10, dehiscing along the lower slightly indented suture but not separating from each other, copiously pubescent with a felted rusty tomentum. Wall. Cat. 5728; W. & A. Prodr. 227; Miq. Flor. Ind. Bat. I, 243; Bak. in Flor. Brit. Ind. II, 175. D. pseudogyroides Miq. Flor. Ind. Bat. I, 244. Hedysarum gyroides Roxb. Hort. Beng. 57. Codariocalyx gyroides Hassk. Flor. (1842) Beiblatt. II, 49. C. conicus Hassk. in Walp. Rep. I, 744. Pseudarthria polycarpa Hassk, Pl. Jav. Rar. 393.

Perak; Kinta river, Kunstler 765! Distrib. India, Indo-China, Malaya.

### 42. SOPHORA Linn.

Trees or shrubs. Leaves odd-pinnate. Flowers showy, yellow or white or violet-purple, racemed or panicled. Calyx oblique subgibbous broadly campanulate; teeth deltoid very short. Corolla much exserted, standard broad; petals equal in length all with long claws; keel obtuse. Stamens free or only obscurely connate at the very base; anthers uniform versatile. Ovary stalked, many-ovuled; style incurved, stigma capitate. Pod moniliform, sublignose or membranous usually indehiscent, the joints turgid and usually terete. Species about 25; widespread in tropical and subtropical regions, a few temperate or alpine.

The above definition applies to the section Eusophora, to which the only Malayan species belongs.

Sophora томентова Linn. Sp. Pl. 373. An evergreen littoral shrub or small tree sometimes reaching 20 feet in height, with all parts at first softly and shortly tomentose. Leaves 6-12 in. long, leaflets 10-17 terminal and in subopposite pairs or often along proximal half of rachis distinctly alternate, elliptic to oval-obtuse 1-1.5 in. long, 5-75 in. wide, thinly coriaceous, with age glabrescent above, persistently softly pubescent beneath, petiolules very short densely pubescent as is the rachis. Flowers in terminal racemes 6 in. long on softly tomentose pedicels, 3 in. long, with deciduous subulate basal bracteoles, 15 in. long. Calyx obliquely truncate, 35 in. long, obsoletely toothed, externally softly pubescent. Corolla yellow, glabrous, '65 in. long'; standard orbicular veined. Stamens almost free to the base, the vexillary filament quite free, the filaments of the other 9 very shortly connate round base of pubescent 10-12-ovuled ovary. Pod moniliform 6-8-seeded, 4-6 in long, the oblong hoary joints separated by stipes as long as themselves. DC. Prodr. II, 95; Wall. Cat. 5333; Roxb. Flor. Ind. II, 316; W. & A. Prodr. 179; Miq. Flor. Ind. Bat. I, 124; Bak. in Flor. Brit. Ind. II, 249. S. glabra Hassk. Cat. Hort. Bog. 285; Miq. Flor. Ind. Bat. I, 125 (fide Baker).

Kedah; Langkawi, Curtis! Dindings; on coast, Scortechini! Curtis! Perak; Larut, Ridley! Pulo Condor; on the coast, Finlayson! Andamans; very common on all the coasts. Distrib. On most tropical seacoasts.

# 43. Ormosia Jacks.

Erect trees or, one species, climbing. Leaves odd-pinnate. Flowers usually in dense terminal racemes. Calya campanulate, deeply 5-cleft,

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the two upper teeth usually distinctly subconnate into an upper lip. Corolla slightly exserted, petals subequalgin length, all short-clawed; standard orbicular sometimes emarginate; keel petals free, and wings oblong, obtuse. Stamens free or only faintly subconnate at the very base, much incurved and exserted when the flower expands; anthers oblong, versatile. Ovary subsessile; style long, filiform, circinate at the tip with an oblique stigma on the inner face. Pod thickly fleshy or woody, or thinly woody, turgid 2-valved continuous within, the sutures without wings. Seeds bright red, with or without arillus. Species about 25, cosmopolitan in the tropics.

Climber; (leaves quite glabrous beneath) Trees :--Seeds large with a black adnate basal aril; (leaves minutely sparsely pubescent underneath):-Panicles fastigiate, flowers white, pedicels stout; pods 2. O. macrodisca. 3 in. wide, seed I in. long Panicles lax, flowers yellow, pedicels slender; pods 1.25 3. O. gracilis. in, wide, seed '75 in, long Seeds small without any aril:-Leaves quite glabrous beneath; (pod '6 in. broad, '4 in. thick, valves thinly woody) 4. O. nitida. Leaves pubescent beneath :-Leaflets distinctly petiolalate; pedicels shorter than calyx; pod with thinly woody valves 6 in. broad, '4 in, thick :-Leaflets (9-13) small (not exceeding 2.5 in.) shortly acuminate (dark green thinly pubescent beneath) ... 5. O. parviflora. Leaflets larger (4 in long) neute or subobtuse :-Leaflets thinly pubescent beneath, pale-green, 7-9; branches thin; panicles lax, bracts small; pubescence grey 6. O. sumatrana. Leaflets densely pubescent beneath, dark-green, 11-13; branches very thick; panicles fastigiate, bracts conspicuous; pubescence rusty O. microsperma. Leaflets sessile; pedicels almost equalling calvx; pod with thickly woody valves 135 in. wide, 1 in. thick ... 8. O. venosa. 1. Ormosia scandens Prain. A large climber over 100 feet long

with stem 6-5 in. in diam.; branches glabrous. Leaves 12-15 in. long; leaflets 5-7, ovate-oblong or the terminal slightly obovate, coriaceous, bright-green, quite glabrous on both surfaces, apex shortly acuminate base rounded, 6-9 in. long. 2.5-3 in. across; secondary nerves 13-18, fine ultimate reticulations rather distinct beneath. Racemes in ample terminal panicles, 12 in. long 6 in. across, with pale-tawny shortly puberulous rachis and branches, pedicels 2 in long, pale-tawny silky, shorter than the calyx, with a minute deciduous basal and 2 subulate

apical persistent bracteoles, '08 in. long, close under calyx. Calyx '25 in, long, finely grey-silky, three lower teeth delioid as long as calyx-tube, two upper subconnate into a shortly bifid upper lip. Corolla 35 in. long, white with a reddish tinge, standard 25 in. across. Stamens quite free, incurved, exserted. Ovary with line of hairs along upper suture, elsewhere glabrous, ovate; style slightly contorted; ovules 3. Pod un-

PERAK; Larut, Kunstler 3560!

A very distinct species differing from the rest in its scandent habit. Mr. Kunstler speaks of it as rare.

2. Ormosia Macrodisca Bak, in Flor. Brit. Ind. II, 253. A large tree with very thick grey glabrous branches. Leaves 8-10 in. long, leaflets 7-9, oblong, very thick and rigid in texture, pale grey-green on both surfaces, quite glabrous above, with a very sparse adpressed pubescence of short hairs beneath, apex acute, base broadly rounded to cuneate, 3-5 in. long, 1.25-2 in. broad, secondary veins 7-9 pairs, faintly prominent beneath. Racemes crowded in terminal fastigiate panicles, 6 in. long, 3 in wide, with brown-silky puberulous rachis and branches, pedicels 1-15 in., brown-silky, shorter than calyx, with a minute basal and 2 minute apical persistent bracteoles close under calyx. Calyx 3 in. long, finely brown-silky, three lower teeth two-thirds, two upper teeth one-third as long as tube, all teeth oblong-obtuse. Corolla 5 in. long, white; standard '4 in. across. Stamens quite free, incurved, exserted. Ovary glabrous, obliquely oblong, ovules 3. Pod hard thick irregularly orbicular, 3 in. across '75 in. thick, at first flattened, at length turgid opposite the usually solitary seed. Seed oblong, 1 in. long, 7 in. wide, bright scarlet, with an adnate, black, pitted aril, 2 in. deep, embracing · its base.

MALACCA; Maingay 600! SINGAPORE; Ridley 2103!

3. Ormosia Gracilis Prain. A slender tree with very thin palebrown glabrous branches. Leaves 5-8 in. long, leaflets 7-9, ovate-lanceolate, chartaceous, pale grey-green on both surfaces, quite glabrous above, with a very sparse adpressed pubescence of short hairs beneath, apex caudate-acuminate, base cuneate, 2.5-3 in. long, 1 in. across, secondary veins 8-9 pairs, very faint beneath not visible above. Rucemes in lax terminal panicles, 5 in. across, with slender branches 6 in. long, faintly adpressed grey-silky as is the rachis, pedicels grey-silky, '15 in. long, very slender, rather shorter than calyx, with lanceolate basal bract, '08 in. long, and 2 very minute triangular apical bracteoles at base of calyx. Calyx 25 in long, firely silky, pale-green, teeth ovatelanceolate, longer than calyx-tube except the two upper. Corolla paleyellow, 35 in. long; standard 25 in. across. Stamens quite free, much

incurved, exserted. Ovary puberulous, ovate-lanceolate; ovules 2. Pod hard, thick, irregularly oblong-ovate, with a short stalk and slightly excentric acute point, 1.5 in. long, 1.25 in. wide, externally covered with a pale blueish bloom; inside white. Seed usually solitary, oblong, 75 in. long, 6 in. wide, somewhat compressed, bright scarlet, with an adnate, black, smooth aril, 15 in. deep, embracing its base.

Perak; Larut, Scortechini 324! Kunstler 4234! Wray 2979!

A very fine species; near to O. macrodisca, but with a smaller pod and seed as well as with smaller leaflets; the seed too has the black arillar portion unpitted. It resembles O. glauca as to leaves though its leaflets are not quite so large; it has however larger seeds than O. glauca has, and the seeds have a black hilum; the seeds of O. glauca are all scarlet.

Ormosia nitida Prain. A tree 30-50 feet high, stem 2 feet in circumference, with stout rusty-brown glabrescent branches. Leaves 5-7 in, long, leaflets 7, obovate or elliptic, base rounded, apex broadly rounded and abruptly shortly cuspidate, very rigidly coriaceous, dark glossy-green quite glabrous on both surfaces, terminal 2.5-4 in. long, 1.3-2 in. wide, rather exceeding the others, secondary nerves very slender, 12-15 pairs. Racemes in fastigiate terminal panicles, 6-8 in. long, 5-6 in. across, rachis and branches faintly puberulous, pedicels puberulous, 15 in. long, shorter than calyx, bracts and bracteoles deciduous. Calyx 2 in. long, rather densely tawny-silky, teeth deltoid, the 3 lower as long as tube the two upper subconnate into a 2-fid upper lip. Corolla unknown. Pod irregularly oblong, I in. long '75 in. across, the valves thinly woody, rigid, quite glabrous and black externally, brown and not suberous within, with a short stalk equalling the calyx-tube. Seed oval, usually if not always solitary, ciunabar-red, 35 in. long 3 in. wide, without arillus.

Perak; Goping, in open jungle, local, Kunstler 6082!

This very distinct species has unfortunately only been reported in fruit. Its pods are very like those of O. microsperma or O. parvifolia but appear to have been glabrous from the beginning. They differ, moreover, very markedly in being shortly stipitate; the leaflets too, are of different shape and firmer texture, besides being quite glabrous on both surfaces.

5. Ormosia parvirolia Bak in Flor. Brit. Ind. II, 253. A fairly large tree with slender persistently brown-velvety branches. Leaves 6-8 in long, leaflets 9-13, oblong, coriaceous, green, glossy above, thinly hairy beneath, apex shortly acuminate, base rounded, the terminal rather larger than the others, 2-25 in long, 6-7 in wide, secondary nerves fine and hardly raised beneath, 8-9 pairs. Racenes in fastigiate terminal panicles with rather short branches, 3-4 in long, 2-5 in wide, with densely brown-velvety rachis and branches, pedicels brown-velvety, very short, each with an ovate-lanceolate basal bract and with 2 ovate

bracteoles under the calyx. Calyx 2 in. long, densely brown-silky, the teeth triangular, the three lower as long as the calyx-tube the two upper rather shorter. Corolla apparently white, 35 in. long, standard 25 in. across. Stamens quite free, incurved, exserted. Ovary ovate, densely silky, ovules 3. Pod orbicular, I-seeded, or oblong and lineate between the seeds if 2-3-seeded, shortly stipitate, valves thin, rigid, at first densely silky soon glabrescent and black externally, reddish-brown inside. Seeds ovoid, 3 in long, 25 in. wide, cinnabar-red, without arillus. Macrotropis bancana Miq. Flor. Ind. Bat. Suppl. 295.

MALACCA; Griffith 1765! Maingay 614! Goodenough 1443! SINGAPORE; Ridley 5929! 8096! PAHANG; Ridley 1267! 5013! DISTRIB. Banka (Teysmann 3405!); Borneo (Haviland 57!)

There is an authentic example of Macrotropis? bancana Miq. at Calcutta; it belongs undoubtedly to this species.

6. Ormosia sumatrana Prain. A large tree with tomentose rather slender ultimately glabrescent branches. Leaves 8-10 in. long, leaflets 7-9 (very rarely 5), ovate or ovate-elliptic or obovate, obtusely apiculate or subacuminate, base rounded, coriaceous, pale-green, glabrous somewhat glossy above, hirsute but at length glabrescent beneath as are the rachis and petiolnles, 2-4 in. long 1-175 in. wide, the terminal exceeding the others, nerves 8-10 pairs, spreading rather prominent beneath. Racemes in lax terminal panicles, 6-8 in long and almost as wide, with pubescent rachis and branches; pedicels 1 in. long, shorter than the calyx, bracts 1 in. long, oblong, very deciduous as are the similar bracteoles at base of pedicels, the two bracteoles under the calyx sub-persistent, lanceolate, '08 in long. Calyx '2 in., externally tawny-pubescent, three lower teeth ovate-lanceolate shorter than tube, the two upper subconnate in a 2-lobed upper lip. Corolla pinkish-white with lilac-purple markings, 35 in. long, standard orbicular emarginate, 3 in. wide. Stamens quite exserted, incurved. Ovary densely puberulous, almost always 3-ovuled. Pod irregularly orbicular if 1-seeded, 1 in. across, oblong and 1.7 in. long if 2-seeded, lineate between the seeds, the valves thinly woody, rigid, black and glabrescent externally. Seed ovoid 4 in, long, 35 in. wide, cinnabar-red without arillus. Macrotropis sumatrana Miq. For. Ind. Bat. Suppl. 294.

Malacca; Brisu, Holmberg 735! DISTRIB. Sumatra (Teysmann 3618! Forbes 2592! 2648!)

Though very closely related to the next species, this is nevertheless easily distinguished by its different leaves and tomentum, its lax panicles, its smaller flowers, and its larger seeds.

The Malacca plant here referred to O. sumatruna has been only once collected; it has inflorescence and flowers exactly as in. O sumatrana but it has not yet been sent in fruit. While therefore we know that it differs from O. microsperma and from O. venosa it is not absolutely certain that it exactly agrees with O. sumatrana.

7. Ormosia Microsperma Bak, in Flor. Brit. Ind. II, 253. A. tree 40 to 60 feet high with thick, densely brown-velvety branches. Leaves 8-10 in. long, leaflets 11-13, oblong or obovate, acute or subobtuse, base broadly rounded, rigidly coriaceous, dark-green, glabrous rather glossy above, densely persistently shortly brown-pubescent beneath as are the rachis and petiolules, 2.5-4 in. long 1.5-2 in. wide, secondary nerves 7-9 pairs, slightly raised beneath. Racemes in ample terminal fastigiate panicles, 8 in. long, 6 in. across, with densely velvety rachis and branches; pedicels 07-12 in, long, much shorter than the calyx, bracts ovate-lanceolate, densely velvety, persistent, 25 in. long, bracteoles at base of pedicels similar but smaller (12 in. long), two bracteoles close under calyx '1 in. long, oblong. Calyx '25 in. long, externally densely velvety, 3 lower teeth as long as calyx 2 upper rather shorter. Corolla white, 45 in. long, standard 35 in. wide. Stamens quite free, exserted, incurved. Ovary densely velvety, 3-4-ovuled. Pod 6 in. across, irregularly orbicular if 1-seeded, oblong and 1-1.2 in. long if 2-seeded, lineate between the seeds, the valves thinly woody, rigid. glabrescent or persistently velvety. Seed ovoid 3 in. long, 25 in. wide, cinnabar-red, without arillus.

Var. typica; pedicels very short, pods when ripe glabrescent. O. coarctata Kurz, Journ. As. Soc. Beng. XIII, 2. 71 hardly of Jackson. Malacca; Griffith 1759! Maingay 532! Derry 1090! Perak; near

Ulu Selangor, Kunstler 8767!

VAR. Ridleyi; pedicels distinct, pods more persistently pubescent. Singapore; Selitar, Ridley, 5574!

The specimens collected by Dr. Griffith have been named by Mr. Bentham "Ormosia coarctata? Jacks." and those collected by Dr. Maingay have been definitely issued as Ormosia coarctata; Mr. Kurz too, has accepted this determination. Mr. Baker however finds that the identification of Griffith's and Maingay's Malacca plant with O. coarctata Jackson (Trans. Linn. Soc. X, t. 25; a plant from Guiana) cannot be sustained.

Ormosia microsperma is nearly related to O. sumatrana (Macrotropis sumatrana Miq.) and is also closely related to Chanolobium septemjugum Miq. and C. decemjugum Miq. (Flor. Ind. Bat. Suppl. 302). Mr. Kurz reduces the genus Chanolobium to Ormosia (Journ. As Soc. Beng. XLII, 2.71); in this he is certainly right. He, however, further considers that both plants are but forms of the same species and that moreover they are both referable to O. microsperma. So far as the material that was at Kurz' disposal goes this appears to the writer to be a premature conclusion, and it seems better for the present to keep Miquel's plants specifically apart.

Mr. Ridley's plant from Singapore differs very considerably from the Perak and Malacca one. The pods are described as hairy in the field note; they are so in the specimens themselves, but those at Calcutta are not quite ripe. If the pods prove to be quite persistently velvety it will probably be necessary to treat the plant as

a distinct species to be named O. Ridleyi.

8. Ormosia venosa Bak. in Flor. Brit. Ind. II, 254. A tall tree, with branches densely persistently velvety-pubescent. Leaves 4-6 in. long, leaflets 7, obovate-oblong, obtuse or subobtuse, base cuneate nearly sessile on the rachis, rigidly coriaceous, greyish-green glabrous but dull above, densely persistently tomentose beneath, 3-4 in. long 1.5-2 in. across, terminal exceeding the rest, secondary nerves 10-12, distinctly raised beneath, rachis densely velvety. Racemes terminal crowded, with rather slender branches, 3-4 in. long and about as wide, rachis and branches densely velvety; pedicels 2 in. long, nearly equalling the calyx, bracts ·15 in. long, lanceolate, persistent, bracteoles at base of pedicels ·1 in. long, 2 bracteoles under calyx minute but subpersistent, Calyx 25 in. long, densely velvety, teeth triangular, three lower as long as tube, two upper subconnate. Corolla 35 in. long, apparently white, standard 3 in. across. Stamens incurved, exserted. Orary velvety. Pod obtuse or subacute, orbicular or oblong, obtuse or subacute, 1:5 in. long, 1:35 in. across, I in thick, the valves very thickly woody, black and glabrous externally. Seeds usually solitary, ovoid, 5 in. long, 4 in. wide, crimson-red, without arillus.

MALACCA; Maingay 533! A very distinct species.

# SUBORDER II. C. ESALPINIE E.

Trees or shrubs, very rarely herbs. Leaves pinnate or 2-pinnate leaflets 1-\infty -paired, rarely simple or 1-foliolate, stipels usually 0, if present very minute. Inflorescence racemose, rarely cymose, very rarely spicate; axillary, lateral, or in terminal panicles. Flowers irregular or very rarely regular, 5-, less often 4-merous. Sepals 5, or 4 from fusion of the upper two, divided to the summit of the disc that lines the short or long calyx-tube, imbricate or rarely valvate, or very rarely united in a toothed or lobed limb. Petals 5, or fewer by abortion, the upper innermost in bud, the others variously imbricate. Stamens 10, or fewer by abortion, very rarely indefinite, free or rarely some or all more or less connate; anthers various. Ovary free or united by its stipe to the discbearing calyx-tube. Seeds various, albumen copious, scanty, or 0. Radicle straight or slightly oblique, hidden between cotyledons, or shortly exserted.

Petals 2 or 0; stamens 2; pod turgid subglobose, wingless, dehiscent	46.	DIALIUM.
	<b>30.</b>	DIABIOM
Anthers versatile:-		
Corolla complete, i.e., with 5 petals; sepals 5; (stamens free):—		
Seeds with albumen; leaves 1-foliolate 2-lobed, rarely		
entire, rarely by fission 2-foliolate	47.	BAUHINIA,
Seeds without albumen; leaves even-pinnate, 2-3-		
(rarely 1-) jugate	48.	CYNOMETRA.
Corolla incomplete, i.e., with fewer than 5 petals;		
sepals 4:—		
Petals present; sepals green; (leaflets even-pin-		
nate):-		
Petals 3; stamens 3 monadelphous	49.	TAMARINDUS.
Petal solitary :-		
Calyx-lobes subvalvate; stamens monadelphous		
9, all or only 2 perfect, funiculus of seed thick		
arillate	50.	SINDORA.
Calyx-lobes much imbricated; stamens free 3	51.	AFZELIA.
Petals 0; sepals coloured:—		
Leaflets even-pinnate; stamens 3-8	52.	SARACA.
Leaflets alternate; stamens 8-10	53.	CRUDIA.
Leaves 2-pinnate; (anthers versatile):-		
Calyx segments subequal; stigma peltate	54.	PELTOPHORUM.
Calyx segments manifestly unequal, the lowest lobe cucul-		
late larger than the rest:-		
Pod wingless	55.	CÆSALPINIA.
Pod winged:—		
Wing extending all along the upper suture	56.	MEZONEURON.
Wing apical, (pod samaroid)	57.	PTEROLOBIUM.

#### 44. Cassia Linn.

Erect shrubs or trees, rarely herbs. Leaves simple, abruptly pinnate. Flowers usually large and showy, in axillary racemes and terminal panicles. Calyx-tube very short; sepals broad or narrow, imbricated. Petals 5, imbricated, subequal, usually broad. Stamens normally 10, but rarely all perfect, 3-5 being often reduced to staminodia or altogether absent; anthers mostly but not invariably basifixed, dehiscing by terminal pores or with the slit more or less continued longitudinally. Ovary sessile or stalked, many-ovuled; style incurved, stigma terminal. Pod very variable, terete or flat, usually septate, the albuminous seeds flattened, sometimes parallel with the valves, sometimes with the septa, dry, dehiscent or indehiscent. Species 340, spread everywhere in the tropics, a few extra-tropical.

Julian Landston Lands
Trees shrubs or stout herbs with large leaflets and
with obtuse sepals:-
Stamens 10, all fertile:—
Lowest 2-3 stamens larger than the rest, pods
terete indeliscent (§ Fistula) :
Flowers pink, in dense corymbs, bracts large
persistent :-
Leaflets acute, corymbs from old nodes below
Agran ganala amaan 1
Leaflets obtuse, corymbs among leaves, sepals
hrough to mample metal- 1
Flowers yellow, in lax racemes, bracts small
doordrown
Lowest stamens not exceeding the rest, pods flat,
dehiscent (§ Psilorhegma) 4. C. glauca.
Stamens 7 only fertile; the 3 upper reduced to sta-
minodes (§ Senna); pods dehiscent, usually more or
less compressed):—
Leaves with glands on the common rachis:-
Glands between the bases of two opposed lea-
flets; leaflets obtuse, pods with oblique dissepi-
ments; seeds rhombohedral:-
Glands between each of the two lower pairs of
ientiets; pedicels short, pods subquadrate 5 C Torre
Gland between lowest pair of leaflets only.
pedicels long, pods subterete
Grands far below leanets and near base of petiols.
leadets acute, pods with transverse disseminents.
seeds ovate, compressed :—
Calyx, leaves and pods densely tomentose;
nowers in subsessile axillary pairs
Calyx, leaves and pods glabrous; flowers in
axillary corymbs :
Leaflets 3-5 pairs; pods flattened 8. C. occidentalis.
Leaflets 8-12 pairs: pods turgid
Leaves with rachis channelled above, berred trans
versely between the leaflets but without glands
shrubs with flowers in strobilate subspicate re-
cemes; pods winged along the valves: leaflets
reaching 6 in.
Trees with flowers in panicles of corymbs, pods
not winged; leaflets not exceeding 2.5 in
Supules large persistent; nod thin volund
mexible, with narrow sutured
Stipules small deciduous: pod with conincers.
Tigid valves, sucures thickened
Stender herbs or undershrubs with warman and it
The state of the s
Leanets linear minute (15 iu. long); pedicals 1 in
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bracteolate above middle; pod 20-25-seeded; stamens all fertile alternately short and long ... 13. C. mimosoides.

Leaflets oblong (4 in. long, 15 in. wide); pedicels 3 in. bracteolate below middle; pod 8-16-seeded; stamens unequal 1-3 upper often sterile ... 14. C. Leschenaultiana.

- § 1. FISTULA DC Sepals obtuse, stamens all antheriferous, the 2-3 lowest larger than the rest and with longer filaments. Pods indehiscent, stipitate, very long, terete with thin brittle ligneous dissepiments between the numerous seeds which are embedded in suberous wad-like discs between the partitions.
- CASSIA NODOSA Ham. in Roxb. Hort. Beng. 31. A tree 40-50 feet high, stem 10-15 inches across, branches spreading, branchlets black glabrous except for the slightly downy tips. Leaves equally pinnate 9-10 in long; leaflets chartaceous 6-12 pairs, opposite, oblong, base rounded, apex shortly acuminate, 2-2.5 in. long, 1-1.25 in. wide, bright green, glabrous and shining above, dull and slightly pubescent, especially on the nerves, beneath; lateral nerves spreading 12-16 pairs, slender but visible beneath, petiolules 15 in. long, puberulous as is the leaf-rachis. Flowers in corymbs 2-3 in, long, from old nodes along the branches, peduncles solitary or 2-4 together, puberulous simple very rarely branched, I in. long, bracts ovate-lanceolate persistent, puberulous, 25 in. long, pedicels puberulous the lower 1.5 in. long. Calyx 5-partite to the base, lobes subequal green, ovate-obtuse, hoary. Petals 5, subequal, carnation to white with a flush of pink, '6-7 in. long, '25 in. wide ovate-acute, distinctly clawed. Stamens 10, all antheriferiferous, the 3 lowest with longer nodose filaments and larger anthers than the others. Pod terete, rather distinctly annulated, 5 in. in diam., 1:5-2 feet long, glossy black with thin brittle ligneous transverse dissepiments between the 60-90 seeds each of which is embedded in a suberous disc 5 in. across 2 in thick. Seeds broadly ovate smooth slightly shining, 35 in. long, 3 in across, 2 in thick, testa pale warm-brown. Wall. Cat. 5331; Roxb. Flor. Ind. III, 336; Wight, Ic. t. 410; Bak. in Flor. Brit. Ind. II, 261.

Andamans; King's Collectors! Malacca; Griffith! Maingay 596! Bukit Tampin, Goodenough 1912! Brisu, Derry 537! Sadanan Reserve, Derry 588! Selandan, Goodenough 125! Penang; Waterfall, Curtis 1576! Perak; Chanderiang, Kunstler 5722! near Ulu Kerling, Kunstler 8732! Goping, Kunstler 4364! Scortechini 1934! Pahang; Makang, Ridley 1359! Distrib. Indo-China, from Sylhet and Chittagong southwards and eastwards; Sumatra (Forbes 1748! 2669!); Borneo (Haviland!)

The Malay names given for this are Sibosok (Goodenough 1912); Busok-busok (Derry 537); and S'busu (Goodenough 125; Derry 588). This name it shares with

C. javanica. It seems that this species does not occur in Java, where C. javanica is its representative.

Cassia Javanica Linn. Sp. Pl. 379. A tree 30-40 feet high, branches spreading; branchlets black glabrous except for the slightly downy tips. Leaves equally pinnate 9-15 in. long; leaflets chartaceous 8-20 pairs, opposite, oblong, base rounded, apex obtuse, 1.5-2 in. long, ·75-9 in. wide, bright-green, glabrescent and slightly shining above, dull and uniformly puberulous beneath, lateral nerves rather oblique 10-12 pairs, slender but visible beneath, petiolules 15 in. long, puberulous as is the leaf-rachis. Flowers in corymbs 6-10 in. long, terminal and from leaf-axils, sometimes paniculately branched, peduncles solitary, often with 1-2 small foliage leaves with 2-4 pairs of leaflets, puberulous, 4-6 in. long, bracts ovate-lanceolate 4-5 in. long, persistent, puberulous, pedicels puberulous the lowest 15 in. long. Calyx 5-partite to the base, lobes subequal crimson to purple-brown, ovate-obtuse, hoary. Petals 5 subequal, rose-pink, 8-1 in. long, 35 in. wide, broadly spathulate obtuse, distinctly clawed. Stamens 10 all antheriferous, the 3 lowest with nodose larger filaments and larger anthers. Pod terete, not very distinctly annulated, '75 in. in diam., 1.25-1.5 feet long, glossy black, with thin brittle ligneous transverse dissepiments between the 50-75 seeds each of which is embedded in a suberous disc '75 in. across '2 in. thick. Seeds broadly ovate, smooth slightly shining, 35 in. long, 3 in. across, ·2 in. thick, testa pale warm-brown. DC. Prodr. II, 490; Wall. Cat. 5309; Benth. Pl. Jungh. 259; Miq. Flor. Ind. Bat. I, 90; Bak. in Flor. Brit. Ind. II, 267; Koord. & Val. Bijdr. II, 8. C. Bacillus Gaertn. Fruct. I, 313; Roxb. Hort. Beng. 31; Flor. Ind. II, 337; Wight, Ic. 252. Rumph. Herb. Amboin. II, 82, t. 22.

Perak; Thaipeng, Wray 4020! DISTRIB. Sumatra (Forbes 1275!); Java,

Mr. Wray is the only collector who has sent this very distinct species to Calcutta from the Malay Peninsula. The Malay name of this Mr. Wray gives as Sibusu, a circumstance that causes no surprise when it is considered how very closely related this species and C. nodosa undoubtedly are.

Cassia Fistula Linn. Sp. Pl. 377. A tree 20-40 feet high with spreading branches and glabrous branchlets. Leaves equally pinnate 8-16 in. long; leaflets coriaceous 4-6 pairs, developing successively, opposite, ovate, tapering from below the middle to a narrow point, base wide-cuneate, 2-6 in. long, 1.5-3.5 in. wide, bright-green, glabrous shining above, dull and paler beneath when young clothed with a close but very caducous silvery pubescence; lateral nerves obliquely spreading 10-20 pairs, slender but visible above somewhat prominent beneath, petiolules 2 in. long stoutish, glabrous as is the leaf-rachis. Flowers in

long lax racemes 12-20 in. long, bracts minute caducous, pedicels glabrous 1·5-2 in. long. Calyx 5-partite to the base, segments broadly spathulate 25 in. long, finely puberulous. Petals 5 subequal, obovate shortly clawed, '8-1 in. long, '6-7 in. wide. Stamens 10 all antheriferous, the 3 lowest with larger and thicker but not nodose filaments, and with larger anthers. Pod terete, '9-1 in. thick, not at all annulated, 1-2 feet long, dull black with thin brittle ligneous transverse dissepiments between the 50-90 seeds each of which is embedded in a suberous disc '8-9 in. across, '2 in. thick. Seeds broadly ovate smooth shining, '35 in. long, '3 in. across, '2 in. thick, testa pale warm-brown. DC. Prodr. II, 488; Roxb. Hort. Beng. 31; Fl. Ind. II, 333; Wall. Cat. 5302; W. & A. Prodr. 285; Miq. Flor. Ind. Bat. I, 89; Bak. in Flor. Brit. Ind. II, 261; Koord. & Val. Bijdr. II, 11. C. rhombifolia Roxb. Hort. Beng. 31; Flor. Ind. II, 334; Wight Ic. t. 269.

MALACCA; fide Baker in Flor. Brit. Ind. AndAMANS; planted, common.

This is the well-known Amaltás or "Indian Laburnum" undoubtedly a native of India but, not in the writer's opinion, entitled to be considered an indigenous tree in Malaya; indeed none of the Malayan botanists have sent specimens to Calcutta. Mr. Baker however alludes to specimens at Kew from Malacca; possibly it is planted in the other provinces also. In the Andamans it only occurs as a planted tree.

- § 2. PSILORHEGMA Vogel. Sepals obtuse, stamens all antheriferous, anthers all subequal. Pods compressed, dehiscent, the disseparents between the seeds membranous.
- 4. Cassia Glauca Lamk Encyc. Meth. I, 647. A small tree 15-20 feet high with glabrous terete branches; stem 4-6 in. in diam. Leaves equally pinnate 6-9 in. long; leaflets 4-6 pairs opposite, membranous or subcoriaceous, pale-green glabrous above, very glaucous and sparsely adpressed-puberulous or glabrous beneath, ovate-acute, base cuneate, 2-4 in. long, 1-2 in. wide, lateral nerves 10-12 pairs indistinct, petiolules '15 in. long, puberulous as is the rachis which is faintly channelled above and furnished with long conical glands between each of the 2-3 lowest pairs of leaflets; stipules falcate narrowly lanceolate 35 in. long, caducous. Flowers in axillary corymbs 4 in. long, 2.5 in. across, the peduncles 2 in. long; lower pedicels 1.25 in. long, spreading, solitary in the axils of small elliptic caducous bracts glabrous as are the peduncles. Calyx 5-partite to the base, segments very unequal, paleyellow, glabrous, all orbicular, the outer '2, the others '3 in across. Petals 5 subequal, spreading, broadly ovate-obtuse shortly clawed, 1 in. long, '75 in. across, pale-primose with faint greenish-yellow veins. Stamens 10 subequal. Pod straight flat very thin, dehiscent, linear, tapering to both ends, flexible, dull, slightly compressed between the seeds, valves thinly coriaceous, 6-8 in. long, 5-7 in. wide, with a stalk

5-6 in. long. Seeds biseriate, 20-30, oval, 25 in. long, 15 in. wide, very thin, testa dark-brown shining. DC. Prodr. II, 495; Wall. Cat. 5312; W. & A. Prodr. 289; Bedd. Flor. Sylvat. 91; Miq. Flor. Ind. Bat. I, 96; Bak. in Flor. Brit. Ind. II, 265. C. surattensis Burm. Flor. Ind. 97. C. arborescens Vahl. Symb. III, 56; Roxb. Hort. Beng. 31. Senna arborescens Roxb. Flor. Ind. II, 345.

Penang; Kunstler 1473! Curtis! Malacca; cultivated, Maingay 595! Perak; Simpang, Wray 2051! Distrib. S.-E. Asia generally, but often, perhaps usually cultivated.

- § 3. Senna Bth. & Hk. f. Sepals obtuse, perfect stamens 7, the 3 uppermost reduced to staminodes, the remainder subequal or the lowest 2-3 with longer filaments and larger anthers than the rest. Pods compressed, rarely subterete, usually dehiscent, the dissepiments between the seeds membranous.
- 5. Cassia Tora Linn. Sp. Pl. 376. An annual feetid herb or undershrub 2-3 feet high. Leaves equally pinnate, distinctly petioled, 3-4 in. long; leaflets 3 pairs opposite, membranous, glaucous, obovateoblong, uppermost leaflets 2 in. long 1 in. wide, lowest pair 1-1.25 in. long 75 in. wide, apex equally acute, base slightly obliquely rounded, glabrous or puberulous on both surfaces, lateral nerves 8-10 pairs, oblique straight rather pronounced beneath, petiolules I in. long, puberulous as is the rachis which is deeply grooved above and furnished with a long conical gland between each of the two lowest pairs of leaflets; stipules linear 75 in. long, caducous. usually in subsessile pairs in axils of the leaves the upper crowded, their common peduncle even in fruit not exceeding 15 in., usually shorter, the pedicels even in fruit not exceeding 35 in. Calya 5-partite to base, segments green ovate-acute glabrous spreading, 2 in long. Petals 5 subequal, spreading, pale-yellow, 3 in. long, 2 in. wide, oblongobtuse, the standard retuse. Stamens 7 (the 3 upper replaced by staminodes) subequal, anthers brown. Pod 6-8 in. long, 15 in. wide, nearly tetragonous, obliquely septate, the valves puberulous membranous not reticulated, sutures broad. Seeds 25-30, rhombohedral, long axis in direction of pod, '15 in. long, '1 in. thick, brown, shining. Linn. Sp. Pl. ed. II. 538 (excl. syn. Roy. Lugd. and excl. VAR. B.); DC. Prodr. II, 493; Roxb. Hort. Beng. 31; Collad. Hist. Cass. 96; Wall. Cat. 5316; W. & A. Prodr. 290 excl. VAR. β.; Miq. Flor. Ind. Bat. I, 90, excl. VAR. B.; Bak. in Flor. Brit. Ind. II, 263 in part only. C. Tagera Lamk. Encyc. Meth. I, 643 not of Linn. U. fætida Salisb. Prodr. 326. C. gallinaria Collad. Hist. 96. C. obtusifolia Linn. Sp. Pl. ed. II, 539 as to all the citations except Sloane, Hist. Jamaica, but not as to the plant; Lour. Flor. Coch. Chin. 323; Miq. Flor. Ind. Bat. I, 95 excl.

var. β. Senna Tora Roxb. Flor. Ind. II, 340. Rumph. Herb. Amboin. V, t. 97, f. 3; Rheede, Hort. Malab. II, t. 53.

Andamans; very common throughout the Settlement. Perak; Kwala Dipong, Scortechini 1750! Distrib. A wide-spread weed in S.-E. Asia.

This is sometimes spoken of as cosmopolitan in the tropics and possibly it has now become introduced in the New World. But if so, it is not common there and the writer has never seen an American specimen.

6. Cassia obtusifolia Linn. Sp. Pl. 377. An annual bland herb or undershrub 2-7 feet high. Leaves equally pinnate, distinctly petioled 3-4 in, long; leaflets 3 pairs opposite, membranous, green, obovateoblong, uppermost leaflets 2 in. long, 1 in. wide, lowest pair 1-1.25 in. long, 75 in. wide, apex broadly equally deltoid, base slightly obliquely rounded, glabrous or puberulous on both surfaces, lateral nerves 8-10 pairs, oblique straight faint on both surfaces, petiolules under 'I in, puberulous as is the rachis which is deeply grooved above and is furnished with a long conical gland between the lowest pair of leaflets; stipules linear 75 in. long, caducous. Flowers usually in subsessile pairs in axils of the leaves the upper crowded, their common peduncle even in fruit not exceeding 15 in usually shorter, the pedicels even in flower 1-1.25 in. long. Calyx 5-partite to the base, segments green ovate-acute glabrous. spreading, 25 in. long. Petals 5 subequal, spreading, bright-yellow. 5 in. long, 35 in, wide, oblong-obtuse, the standard truncate. Stamens 7 (the 3 upper replaced by staminodes) subequal, anthers brown. Pod 8-10 in. long, 2 in. wide, sub-terete, obliquely septate, the valves glabrous, membranous, distinctly transversely reticulated, sutures broad. Seeds 30-35, rhombohedral, 2 in. long, 15 in. thick, brown shining, Linn. Sp. Pl. ed. II, 539 as to the plant but excl. the ref. to Dillenius and to Rumphius; DC. Prodr. II, 493; Collad. Hist. Cass. 95. C. toroides Roxb. Hort. Beng. 31. C. humilis Collad. Hist. Cass. 96. C. Tora VAR. β. Linn. Sp. Pl. 376. C. Tora VAR. β. W. & A. Prodr. 291 excl. references to Rheede and to Lamarck; Miq. Flor. Ind. Bat. I, 95. C. Tora Bak. in Flor. Ind. Bat. II, 263 in part, not of Linn. C. obtusifolia VAR. B. Mig. Flor. Ind. Bat. I, 96, not VAR. a. Senna toroides Roxb. Fl. Ind. II, 340.

SINGAPORE; common, Hullett 102! Kunstler 124! DISTRIB. Native in Tropical America; now introduced and, here and there, fairly common in South-Eastern Asia.

Dr. Roxburgh was at some pains to point out how different this species is from C. Tora. The confusion of indentification originated with Linnæus himself and has been perpetuated owing to the fondness that many authors have for books and names as compared with plants and facts.

7. Cassia Hirsuta Linn, Sp. Pl. 378. A diffuse tomentose under-

shrub 2-5 feet high usually of annual duration. Leaves equally pinnate 4-S in. long; leaflets 3-6 (rarely 2) pairs, opposite, membranous, green, fætid, ovate-acuminate with enneate base, rather densely pilose on both surfaces, 1.5-3.5 in. long, 1-1.5 in. wide, lateral nerves about 6 pairs straight ascending, petiolules very short pilose as is the leaf-rachis which has a single large gland 2 in. above its base; stipules subulate membranous 35 in. long. Flowers usually in subsessile pairs in axils of leaves, the upper crowded, their common pedurcle even in fruit not exceeding 15 in., pedicels in fruit 5 in. long, erect, rigid, pilose. Calyx 5-partite to base, segments pale, ovate-subacute, pilose externally, 25 in. long. Petals 5, subequal, spreading, bright-yellow, 45 in. long, 25 in. wide ovate-oblong obtuse. Stamens 7 (the 3 upper replaced by staminodes) the 3 lower longer and with larger anthers than the two lateral pairs; anthers brown. Pod slightly falcate, 6-8 in. long, 25 in. wide, subterete, faintly transversely septate, the valves densely villous, papery, very faintly reticulated and faintly depressed between the seeds, sutures broad. Seeds 90-120, ovate, small, dull-brown, 15 in. long, 1 in. wide, 07 in, thick. DC. Prodr. II, 497; Bak. in Flor. Brit. Ind. II, 263. C. tomentosa Wall. Cat. 5304 not of Linn.

SINGAPORE; very common, Anderson 44! Hullett 75! Kunstler 317! DISTRIB. An American weed now naturalised in many parts of S.-E. Asia.

8. Cassia occidentalis Linn. Sp. Pl. 377. A diffuse subglabrous undershrub 2-5 feet high usually of annual duration. Leaves equally pinnate 6-8 in. long; leaflets 3-5 pairs opposite, membranous, glaucous, feetid, ovate-oblong with rounded base, tapering to an acuminate tip, glabrous above, glabrous or finely pubescent beneath, 1-3 in. long, 5-1.25 in. wide; lateral nerves 6-10 pairs spreading, petiolules very short glabrous as is the leaf-rachis which has a single large globose gland at its base. Flowers in axillary short-peduncled few-fld. corymbs arranged in a terminal panicle, bracts white with pink tinge, thin, ovate-acuminate, caducous, 5 in. long; pedicels 15-2 in. long, sparsely puberulous, spreading, in fruit reaching '5 in. long, ascending, rigid. Calya 5-partite to base, segments white faintly tinged with pink, glabrous, membranous, obtuse, 3 in. long. Petals 5 subequal, yellow very faintly veined with orange, 5 in. long, 3 in. wide, ovate-obtuse. Stamens 7, (the 3 upper replaced by staminodes) the 3 lower longer and with larger anthers than the two lateral pairs; anthers brown. Pod slightly falcate, compressed, transversely septate, sutures rigid, valves depressed between the 20-30 seeds, 4-5 in. long, 35 in. wide, 2 in. thick. Seeds broadly ovate, small, pale-brown, 2 in. long, 15 in. across, 1 in. thick. DC. Prodr. II, 497; Roxb. Hort. Beng. 31; Bot. Reg. t. 83; W. & A. Prodr. 290; Miq.

Flor. Ind. Bat. I, 94; Bak. in Flor. Brit. Ind. II, 262. C. fætida Pers. Synops. I, 457. C. Sophera Wall. Cat. 5317 L. not of Linn. Senna occidentalis Roxb. Flor. Ind. II, 343.

In all the Provinces, a very common weed of waste places. DISTRIB. Cosmopolitan in the tropics but in all probability derived originally from America and only introduced in the Old World.

Mr. Baker describes the flowers as pale lilac; this they appear never to be in South-Eastern Asia.

9. Cassia Sophera Linn. Sp. Pl. 379. A diffuse sub-glabrous shrub 8-10 feet high, annual or subperennial. Leaves equally pinnate 8-10 in. long; leaflets 8-12 pairs opposite, membranous, glaucous, lanceolate with cuneate base, apex acuminate, glabrous, 2-3 in. long '5-'75 in. wide; lateral veins 10-12 pairs spreading; petiolules very short glabrous as is the leaf-rachis which has a single large conical gland ·2-25 in. above its base. Flowers in axillary distinctly peduncled fewfld. corymbs, bracts green evate-acute minute caducous. '15 in. long, pedicels 25 in. long sparsely puberulous spreading; in fruit reaching \*5 in. long ascending rigid. Calyx 5-partite to base, segments green glabrous firmly membranous obtuse 25 in long. Petals 5 subequal, yellow, hardly at all veined, '5 in. long, '3 in. wide, ovate-obtuse. Stamens 7 (the 3 upper replaced by staminodes) the 3 lower longer and with larger anthers than the two lateral pairs, (sometimes one of these also reduced to a staminode). Pod slightly falcate, turgid, transversely septate, sutures slender, valves not depressed between the 30-40 small seeds, 3-4 in. long, 35 in. wide, 2 in. thick. Seeds broadly ovate rather dark-brown, 24 in. long, 15 in. across, 1 in. thick. DC. Prodr. II, 492; Roxb. Hort. Beng. 31; Wall. Cat. 5317 partly; W. & A. Prodr. 287; Miq. Flor. Ind. Bat. I, 92; Bak. in Flor. Brit. Ind. II, 262. C. esculenta Roxb. Hort. Beng. 31. C. chinensis Jacq. Ic. t. 73. C. frutescens Mill. Dict. n. 2. C. coromandeliana Jacq. Fragm. 67, t. 100. Senna Sophera Roxb. Fl. Ind. II, 347. S. esculenta Roxb. Fl. Ind. II, 346. Rumph. Herb. Amboin. V, 283, t. 97, f. 1.

Andamans; much less common than *C. occidentalis*. Penang; fide Baker. Distrib. Originally American, now cosmopolitan in the tropics.

This species has not been sent by any Malayan botanist to the Calcutta Herbarium. Its presence in Penang is however mentioned by Mr. Baker; the collector's name is not given. It was not Dr. Wallich; Wallich's Malayan "C. Sophera" (Cat. 5317 L.) is all C. occidentalis. It is strange that though this species appears to have been earlier of introduction to—at all events to have been longer known—in S.-E. Asia, it is now, though almost equally wide-spread, much less "common" than the more recently introduced C. occidentalis.

10. Cassia alata Linn. Sp. Pl. 378. A shrub 5-8 feet high with very thick finely downy branches; stem often 4-5 in. thick, scarred

with cicatrices of fallen leaves and marked by the persistent rather Leaves equally pinnate 1-2 feet long; leaflets 8-14 rigid stipules. pairs opposite, rigidly chartaceous, green, linear-oblong to oblong, obtuse or emarginate, apiculate, base obliquely rounded or truncate, glabrous on both surfaces or sometimes obscurely downy beneath, gradually increasing in size from base upwards, 2-6 in. long, 1-2.5 in. wide, lateral nerves 10-15 pairs ascending curved towards extremities, distinct above and very prominent beneath, secondary venation beneath distinct; petiolules very short glabrous as is the leaf-rachis, which is deeply channelled above with firm yellow borders and with transverse ridges occasionally slightly apiculate in the middle between each pair of leaflets, but with no true gland; stipules 25 in long, auriculate, rigid, pointed, persistent. Flowers in peduncled subspicate racemes, 6-18 in, long, at first enveloped in large membranous strobilate yellow caducous bracts '75 in. long, '6 in. wide, ovate, subacate or obtuse; pedicels '15 in. (in fruit '25 in.) long, very finely puberulous as is the thick rachis. Calyx 5-partite to base, segments spathulate obtuse, 1 in. long, 6 in. wide, yellow, membranous, glabrous. Petals 5 subequal, bright yellow veined with orange, ovate-orbicular shortly clawed, 1.25 in. long, 75 in. wide. Stamens 7 (the 3 upper reduced to staminodes) the 3 lowest with long filaments and two of these with very large anthers; the two lateral pairs with short filaments and small anthers. Pod straight rigid divaricately spreading glabrous dehiscent, 6 in. long 8 in. wide, sutures narrow, valves with a crenulated chartaceous wing 35 in. wide running from end to end. Seeds 50-60 flattened, triangular, the sides straight with acute point at hilum, the base somewhat rounded, 25 in. long, 2 in. wide, 1 in. thick, testa smooth shining brown. DC. Prodr. 11, 492; Roxb. Hort. Beng. 31; Wall. Cat. 5301; W. & A. Prodr. 287; Wight, Ic. t. 253; Miq. Flor. Ind. Bat. I, 93; Bak. in Flor, Brit. Ind. II, 264. C. bracteata Linn. f. Suppl. 232; DC. Prodr. II, 492. C. herpetica Jacq. Obs. II, 24, t. 45, f. 2. Senna alala Roxb Flor. Ind. II, 349.

ANDAMANS; common, King! Prain! PERAK; Scortechini! MALACCA; Griffith! DISTRIB. Cosmopolitan in the tropies.

11. Cassia timoriensis DC. Prodr. II, 499. A shrub or small tree 6-30 feet high, with virgate pubescent branches. Leaves equally pinnate, 1-1.5 feet long; leaflets 16-24 pairs, opposite, membranous, palegreen, glabrescent to densely pubescent above, sparsely pubescent to softly densely tomentose beneath, lanceolate-oblong with a fine point at the rounded apex and with obliquely rounded base, 1-1.75 in long, ·35-·65 in. wide, lateral nerves 8-10 pairs inconspicuous, petiolules ·07 in. long, pubescent as is the rachis which is channelled above and trans-



versely harred between the leaflets; stipules lanceolate to auriculate foliaceous persistent, usually larger in the region of the inflorescence, ·25 in. long. Flowers in a large erect terminal panicle extending into the axils of the upper leaves, 1-1.25 feet long, 6 in. across, composed of alternate corymbs 2-3 in. long, 1.5 in. across; lower pedicels 1 in. long, solitary in axils of small deciduous bracts, rusty- or yellow-pubescent as are the branches and main-rachis. Calyx 5-partite to base, segments distinctly unequal, oblong-obtuse, densely pubescent outside, the larger 3 in the smaller 2 in long. Petals 5 oblong, 6 in long, 3 in wide, bright-yellow faintly veined with orange. Stamens 7 (the 3 upper reduced to staminodes) the 3 lower with longer filaments but not much larger anthers than the two lateral pairs. Pod straight, flat, very thin, dehiscent, linear, slightly tapering to both ends, glossy and flexible, valves thinly coriaceous, 5-6 in. long, '5 in. wide, with a stalk '3 in. long. Seeds biseriate, 16-20, oval-obtuse 25 in. long, 2 in. across, very thin, testa dark brown, shining, with a dull paler vertical central patch.

Var. typica; leaflets glabrescent above, sparsely pubescent beneath, stipules of the upper leaves narrower. C. timoriensis Miq. Flor. Ind. Bat. I, 99; Bak. in Flor. Brit. Ind. II, 265; Koord. & Val. Bijdr. II, 13.

Керан; Coah Langkawi, Curtis 2094! DISTRIB. India; Indo-China; Malay Archipelago.

Var. xanthocoma Miq.; leaflets pubescent above, densely goldentomentose beneath, stipules of the upper leaves very broad. C. palmata Wall. Cat. 5306 A. C. xanthocoma Miq. Analect. Ind. I, 10. C. timoriensis var. xanthocoma Miq. Flor. Ind. Bat. I, 99. C. timoriensis var. chrysocoma Koord. & Val. Bijdr. II, 14.

PERAK; Kwala Dipong, growing near limestone, Kunstler 8255! Scortechini 1751! Goping, Kunstler 689! Ulu Bubong, Kunstler 10087! DISTRIB. Tenasserim, Malay Archipelago.

The two varieties are very easily distinguished but they do not differ at all in essentials. The Bornean specimens of *C. zanthocoma* first received by Miquel were without fruit; on seeing pods that author himself very justly reduced his species, as a variety, to *C. timoriensis*.

12. Cassia siamea Lamk Encyc. Meth. I, 648. A tree 30-50 feet high with smooth bark and spreading branches; stem 12-18 in. in diam. Leaves equally pinnate, 6-12 in. long; leaflets 4-16 pairs, opposite, subcoriaceous, rather dark-green shining above, dull and paler beneath, oblong-obtuse or retuse minutely mucronate, base rounded, 1.25-2.5 in. long, 5-9 in. wide, lateral nerves 10-12 pairs obscure above fine but distinct beneath, petiolules distinct 1 in. long, glabrous as is the rachis which is channelled and is transversely barred between the leaflets above but is without glands; stipules minute subulate caducous.

Flowers in large erect terminal panicles extending into the axils of the unper leaves. 8-16 in. long, 6-8 in. across, composed of alternate crowded corymbs 3-4 in, long, 2 in, across; lower pedicels 1 in, long solitary in axils of small lanceolate bracts 2 in. long, grey-pubescent as are the branches and main rachis. Calyx 5-partite to base, segments distinctly unequal, ovate-obtuse, greenish-vellow, downv externally, the larger :35 in, the smaller '2 in, long. Petals 5 suborbicular, '75 in, long, '6 in, wide, except the upper obcordate '6 in. long, '5 in. wide, all rather pale uniform-vellow. Stamens 7 (the 3 upper reduced to staminodes) the 3 lower with much larger anthers and longer filaments than the 2 lateral pairs. Pod nearly straight, flat, thin, slightly swollen opposite the seeds, sutures faintly thickened, valves thickly coriaceous, sparsely puberulous, 6-9 in, long, 5 in, wide, with a distinct stalk 5 in, long, Seeds biseriate 20-30, oval, 3 in. long, 25 in. across, very thin, testa dark-brown, shining. Bak, in Flor. Brit. Ind. II, 264. C florida Vahl. Symb. III, 57; DC. Prodr. II, 499; W. & A. Prodr. 288; Bedd. Fl. Sylv. t. 179; Mig. Flor. Ind. Bat. I, 98. C. sumatrana Roxb. Hort. Beng. 31; DC. Prodr. II, 506; Wall. Cat. 5305. Senna sumatrana Roxb. Flor. Ind. II, 347.

Perak; near Ulu Selangor, Kunstler 8668! Blanja, Wray 147! Malacca; Brisu, Holmberg 869! Pahang; Pulo Rumpit, Ridley 2648! Distrib. India, Indo-China, Malay Archipelago.

Mr. Wray gives the local name of this in Perak as Pako Nennong and notes that the wood is strong and tough. Mr. Holmberg gives the name in Malacca as Juál.

- § 4. CHAMECRISTA DC. Sepals narrow; stamens 5 or 10 all perfect equal, or with the uppermost one smaller than the others and sometimes replaced by a staminode. Pod dehiscent small strap-shaped, flat, the seeds compressed parallel with the more or less oblique valves.
- 13. Cassia mimosoides Linn. Sp. Pl. 379. A low diffuse perennial, subserect or spreading, simple or much branched, glabrous or pubescent, sometimes suffrutescent 2-3 feet high; stem terete. Leaves 3-4 in long, equally pinnate; leaflets 40-60 pairs, linear with a distinct oblique mucro, '1-'15 in. long, glabrous on both surfaces, rachis puberulous with a small sessile gland on the petiole below the lowest pair of leaflets, stipules finely subulate, straight, '2 in. long. Flowers axillary, solitary or 2-3 together, pedicels unequal, ultimately 1 in. long, bracteolate above the middle; buds pointed narrow. Calyx 5-partite to base, segments unequal linear-lanceolate to oblong-acute, '25-'3 in. long. Petals 5 subequal, elliptic or orbicular, shortly clawed, obtuse, '35 in. long. Stamens 10 perfect, alternately longer and shorter. Poil 2 in. long, '2 in. across, linear, flattish. Seeds 20-25, obliquely rhomboid, compressed, testa dark-brown, shining. DC. Prodr. II, 503;

Miq. Flor. Ind. Bat. I, 101; Bak. in Flor. Brit. Ind. II, 266. U. anyustissima Lamk. Encyc. Meth. I, 650; DC. Prodr. II, 505; W. & A. Prodr. 292. C. sensitiva Roxb. Hort. Beng. 32. C. tenella Roxb. Hort. Beng. 31. Senna sensitiva Roxb. Flor. Ind. II, 353. S. tenella Roxb. Flor. Ind. II, 354.

PROV. WELLESLEY; Tasek Selangor, Ridley 6995! PENANG; Government Hill, Curtis 2507! DISTRIB. Throughout South-Eastern Asia.

14. Cassia Leschenaultiana DC. Mem. Soc. Hist. Nat. Gen. II, 2, 132. A suberect perennial, rather softly pubescent, 2-3 feet high, stems terete. Leaves equally pinnate 1-2 in. long, leaflets 16-24 pairs, narrowly oblong with a distinct oblique mucro and 4-6 strong very oblique secondary nerves, glabrous or puberulous, 4-6 in. long, 1-15 in, across; rachis pubescent, with a large sessile gland on the petiole below the lowest pair of leaflets, stipules lanceolate straight 35 in. long. Flowers axillary, solitary or 2-3 together, pedicels unequal, ultimately ·25-·35 in. long, bracteolate not far above the base, buds pointed. Calyx 5-partite to base, segments unequal linear-lanceolate to oblong-acute, 35 in. long. Petals 5 subequal, elliptic or orbicular, shortly clawed, obtuse, ·4-6 in, long. Stamens 10 or 9 or 7 (all perfect or with the uppermost, or the three uppermost, reduced to staminodes), the 2-3 lowest often rather larger than the lateral ones. Pod 1-1.5 in. long, 2 in. across, linear, flattish. Seeds 8-16, obliquely rhomboid, compressed, testa brown shining. DC. Prodr. II, 504. C. Wallichiana DC. Prodr. II, 505; W. & A. Prodr. 292. C. mimosoides VAR. Wallichiana Bak. in Flor. Brit. Ind. II, 266.

Penang; Government Hill, Curlis 829! SINGAPORE; Hullett 663! DISTRIB. India; Himalayas; Indo-China.

This is reduced to C. mimosoides by Mr. Baker but it seems better in the meantime to keep the two plants apart. They are certainly, as Mr. Baker indicates, very closely related, but they do not much resemble each other and are not easily confounded.

## 45. Koompassia Maingay.

Very tall erect trees. Leaves odd-pinnate with alternate leaflets. Flowers copious small, obscure, in ample terminal panicles; bracts small deciduous. Calyx-tube very short conical, or none; sepals 5, lanceolate, subequal, very slightly imbricated. Petals 5 subequal, their margins not meeting. Stamens 5, filaments short or very short, anthers equal basifixed, dehiscing by two apical pores. Ovary sessile, subglobose or slightly elongated, 1-ovuled; style short acute, stigma small, terminal. Pod oblong, compressed, winged throughout its circumference, narrowed and somewhat twisted at the base, indehiscent. Seed solitary situated

near the middle of the pod; compressed, exalbuminous; cotyledons leafy, radicle short straight. Species 4, Malayan.

Leaflets green beneath; panicles rusty-pubescent; petals exceeding sepals and stamens; anthers short broad; ovary subglobose, rusty-pubescent

1. K. malaccensis.

Leaflets glaucescent beneath, much smaller; panicles grey, puberulous; petals much shorter than sepals and stamens; anthers long narrow; ovary compressed, very nearly glabrous

... 2. K. parvifolia.

KOOMPASSIA MALACCENSIS Maingny ex Benth. in Hook. Icon. Pl. XII, 58. t. 1164. A tree 80-100 feet high, with stem 3-4 feet in diameter; branches closely rusty-pubescent at length glabrescent. Leaves alternate odd-pinnate, 5-8 in. long, rachis rusty-pubescent; leaflets 7-9 alternate, ovate-lanceolate or oblong, acuminate, apex obtuse slightly emarginate, base rounded, 2-3 in. long, 8-1.25 in. wide, coriaceous, dark-green glabrous and shining above, rather paler, dull and sparsely adpressed rusty-puberulous beneath; lateral nerves 10-12 pairs, faintly visible above, distinct beneath and connected by a fine reticulate secondary venation; petiolules rusty-pubescent 25 in. long. Panicles terminal and extending into the axils of the uppermost leaves 5 in. long, 3-4 in. across; branches 2 in long, pedicels 2 in. long; all parts densely rusty-pubescent. Calyx-tube obsolete; sepals 5 slightly imbricate ovate-acute, 12 in. long, densely rusty externally. Petals 5, oblong, obtuse, white, 15 in. long, slightly exceeding the sepals, two and a half times as long as stamens. Stamens 5, filaments very short glabrous; anthers slightly incurved twice as long as broad, widely triangular. Ovary subglobose, densely rusty-pubescent, 1-ovuled; style short. Pod oblong, compressed, 4-5 in. long, 1.25-1.5 in. wide, reticulately wide-veined opposite the solitary seed. Seed 1.5 in. long, .65 in. wide, cotyledons foliaceous; cordately 5-nerved at base, nerves conspicuous. Tanbert in Engl. Natürlich. Pflanzenfam. III, 3. 156.

PERAK; Larut, Kunstler 7692! Thaipeng, Wray 2388! near Blangie, Scortechini 1712! MALACCA; Merliman, Selandar, Sungei Udang, etc.; Maingay 557 (fide Bentham); 604! Derry 51! Holmberg 880! Goodenough 1416! SINGAPORE; Selitan, etc.; Ridley 4567! 6403! Cantley (fide Taubert). Penang; T. Bahang, Curtis 432! DINDINGS; Lumot, Curtis! DISTRIB. Sumatra (River Rawas, Forbes!).

This is the fine tree which the Malays know as Kumpass. Another species from Borneo (K. Beccariana Taubert,-founded on Beccari n. 2690) is evidently closely related; there are no specimens of the species at Calcutta. The description and drawing of the anthers in the original account of the genus are somewhat

KOOMPASSIA PARVIFOLIA Prain. A tree 80-100 feet high, branchlets glabrous or only puberulous at the tips. Leaves alternate oddpinnate, 3-4 in. long, rachis grey-silky; leaflets 9-11 alternate, elliptic-lanceolate, apex obtuse slightly emarginate, base widely cuneate, 1-1·25 in. long, '25-35 in. wide, chartaceous, medium-green, glabrous and shining above, glaucescent and sparsely silky-pubescent beneath; lateral nerves 4-5 pairs, quite invisible above and very faint beneath; petio-lules grey-silky, '2 in. long. Panicles terminal, 5 in. long, 2·5-3 in. across, branches 1·5 in. long, pedicels '15 in. long slightly thickened under the calyx; all parts closely grey-silky. Calyx-tube short conical; sepals 5 slightly imbricate, ovate-lanceolate, margins of the inner slightly narrower, recurved, all '15 in. long and silky-puberulous externally. Petals 5, elliptic, white, one-third as long as sepals, half as long as stamens. Stamens 5, filaments very short glabrous; anthers distinctly incurved, four to five times as long as broad, narrow-lanceolate. Ovary compressed glabrous except for a few hairs at the base, 1-ovuled; style short. Pod not seen.

PERAK; Goping, Scortechini 1996!

This fine tree is known to the Malays as Tualang; its timber is largely used for building purposes. In this respect it resembles the preceding species as well as another famous timber-tree from Borneo the Tupan (Koompassia excelsa Taub. = Abauria excelsa Beccari).

From Signor Beccari's description of Tapan it is evidently a tree of much more gigantic proportions than the Tualang. Its foliage is probably similar for its leaflets are described as being of about the same size; the number of leaflets to a leaf Beccari does not state. But the flowers are very different for in Tapan the petals are hardly shorter than the sepals and are about the same length as the stamens, while the anthers are shorter than the filaments; in Tualang the petals are very small and the authers are exceedingly long as compared with the filaments.

#### 46. DIALIUM Linn.

Erect unarmed trees. Leaves odd-pinnate with more or less distinctly alternate leaflets. Flowers copious small obscure in ample terminal panieles. Calyx-tube very short; free segments lanceolate or ovate lanceolate, subequal, much imbricated, deciduous. Petals 0 (in all Malayan species). Stamens 2, erect, included; anthers attached near the base, dehiscence longitudinal. Ovary sessile, 2-ovuled; style filiform stigma terminal. Pod firm, dry, indehiscent, oblong, 1-seeded; endocarp pulpy. Seed albuminous, embryo foliaceous, radicle straight. Species about 15, cosmopolitan in the tropics, chiefly however in S.-E. Asia.

Leaves quite glabrous on both surfaces:-

Pods large, (firm), 1.5 in. long, strongly umbonate at

apex ... 1. D. Kunstleri.

Pods smaller, not exceeding 1 in. in length, obtuse or only faintly apiculate:-

Pods fragile not velvety; leaflets thinly coriaceous:-Pedicels as long as calyx, panicles laxly spreading Pedicels shorter than calyx, panicles erect :-

Leaflets lanceolate alternate; seeds subquadrate longitudinally striate

Leaflets elliptic opposite; seeds orbicular reticu-

D. laurinum. Pods firm, velvety; leaflets rigidly coriaceous D. Maingayi.

Leaves more or less pubescent beneath:

Leaflets large, 5-7:-

Leaflets opposite or nearly so, very faintly puberulous beneath; sepals pubescent within Leaflets conspicuously alternate, thickly covered beneath with golden-brown pubescence; sepals pubescent within

7. D. platysepalum.

Leaflets small, 9-15:-Leaflets 9-11, conspicuously alternate, thickly covered beneath with golden-brown pubescence; sepals glabrous within ... Leaflets 13-15, opposite, rusty tomentose beneath; sepals puberulous within

D. Wallichii.

2. D. patens.

3. D. indum.

6. D. ambiguum.

9. D. Kingii. DIALIUM KUNSTLERI Prain. A tree 100-130 feet high with spreading branches, stem 2-3 feet thick; branchlets slender, pale, rugose glabrous. Leaves alternate, odd-pinnate, 5-6 in. long; leaflets 5, rarely 3, alternate or subopposite, ovate-lanceolate, narrowly acuminate, apex entire, base cuneate, 4-5 in. long, 1.25-1.5 in. wide, coriaceous, rather dark-green shining above, dull and pale green beneath, glabrous on both surfaces; lateral nerves ascending 5-6 pairs hardly visible above, faint beneath and with there a very faint reticulate intermediate secondary venation; petiolules stout, very short, 1 in. long, glabrous. Panieles terminal and axillary 4 in. long, 3 in. wide; branches 2 in. long, glabrous, pedicels (in fruit) 2 in. long. Calyx and stamens not Pod subspherical, hardly compressed, obliquely prominently umbonate at the tip, firm, 1.5 in. long, 1.35 in. across; glabrous, very faintly verrucose, black. Seed solitary subrotund, smooth, dark-brown, dull, 6 in. long, 5 in. wide, 2 in. thick.

Perak; Goping, 500-800 feet, Kunstler 4415!

This very fine species, easily distinguished from all the others by its much larger pods with very pronounced umbonate apex, has been but once reported and then, unfortunately, without flowers. It is perhaps most nearly related to D. indum from which, however, besides differing as to fruits it is also distinguished by its thicker and fewer leaflets. No native name has been given for the species.

- DIALIUM PATENS Bak. in Flor. Brit. Ind. II, 270. A tree 60-80 feet high with a rather slender stem 10-20 in. thick; branchlets slender smooth pale-brown glabrous. Leaves alternate, odd-pinnate, 5-6 in. long; leaflets 3-5, opposite or subopposite, oblong to elliptic, rather abruptly cuspidately narrowed to an obtuse entire apex, base rounded, 3-5 in. long, 1.5-2.25 in. wide, subcoriaceous, bright-green and shining above, paler and dull beneath, glabrous on both surfaces; lateral nerves 8-10 pairs spreading, fine but distinct on both surfaces as is the reticulate intermediate secondary venation; petiolules stout, glabrous, ·25 in. long. Panicles terminal and axillary, 6-8 in. long, 4-5 in. wide, rachis and branches slender and flexuous, glabrous; pedicels glabrous spreading or cernuous, 2-25 in. long. Calyx 15 in. long, ovoid-oblong in bud, tube obsolete, segments 5, white and almost petaloid, subequal, much imbricated, ovate-oblong obtuse, finely grey-pubescent on both surfaces, the two upper segments sometimes faintly connate. Petals 0. Stamens 2, filaments short slender, connective puberulous, anthers oblong basifixed. Ovary silky, narrowly-ovate, sessile, tapering upwards to the slender incurved style; ovules 2. Pod ovoid, slightly compressed, apex not apiculate, fragile, black, thinly grey-pubescent, 5 in. long 35 in. across, 3 in. thick. Seed solitary, nearly regularly oblong in shape with rounded angles, 3 in. long, 25 in. across, 15 in. thick, darkmarcon in colour, only slightly shining, neither striate nor reticulate.
- PERAK; Larut, at low elevations, Kunstler 5551! 5577! MALACCA; Griffith 1846 (K. D.)! Maingay 537! DISTRIB. Borneo.
- "Maingay 537" forms, with "Griffith 1846," the basis of this species. The description here given of pod and seed is drawn up entirely from an example of "Maingay 537." The discrepancy between the description in the F. B. I. and the actual fruit of the species the writer is unable to explain.
- 3. Dialium indum Linn. Mantiss. 24. A tree 60-70 feet high with spreading branches; branchlets slender, rugose, grey-puberulous. Leaves alternate, odd-pinnate, 6-8 in. long; leaflets 5-9, alternate or subopposite ovate-oblong to ovate-lanceolate, narrowly acuminate apex entire, base cuneate, 3-4 in. long, 1-1.5 in. wide, chartaceous, darkgreen slightly glossy above, dull and rather paler beneath, glabrous on both surfaces; lateral nerves 8-10 pairs, faint above more pronounced beneath and with there a distinct reticulate intermediate secondary venation; petiolules glabrous 2 in. long. Panicles terminal and axillary, 4 in. long, 3 in. wide; branches from 25-2 in. long, faintly silky-puberulous as are the pedicels 1 in. long, usually in clusters of 3, with caducous basal bracts. Calyx 15 in. long, obtuse-oblong in bud, tube obsolete, segments 5 subequal much imbricate ovate-oblong obtuse, grey-puberulous on both surfaces. Petals 0. Staniens 2, opposite the two

upper calyx segments, filaments very short slender, anthers large oblong, basifixed, dehiscing longitudinally. Ovary silky, ovate, sessile, tapering upwards somewhat abruptly into a slender incurved style; ovules 2. Pod suborbicular, '9 in. wide, slightly compressed, shortly apiculate, fragile, finely puberulous with minute silky hairs but not velvety. Seed solitary, obovate-quadrate, brown, finely longitudinally striate, shining, '5 in. long, '4 in. wide, '15 in. thick. Linn. Mantiss. 511; Benn. Pl. Jav. Rar. 136, t. 30; Miq. Flor. Ind. Bat. I, '79; Koord. & Val. Bijdr. II, 20. D. javanicum Burm. Fl. Ind. 12. Carandjs Bontius, Hist. Ind. Or. 93; Rumph. Herb. Amboin. II, 93, footnote. Tamarindus monococcus minor, etc. Plunk. Mantiss. 177; Amalth. 198, t. 144, f. 4.

Pahang; Pijaie, Pahang river, Ridley 2607! Penang; Ayer Etam, Gurtis!

This is the Kranji of the Malays in Java according to Bontius, Rumphius, Miquel and Koorders. Mr. Ridley's specimens have no native name and as there is no indication that they are from a planted tree it may be reasonably supposed that the species is indigenous in Pahang. The specimens sent by Mr. Curtis are noted as being from "Ayer Etam in Miller's compound;" this remark, taken in conjunction with the fact that two native names "Kranji borong or Kranji padie" are given as alternatives, seems to point to the species being an introduced one in Penang. The name Kranji borong is sometimes applied in Malacca to the quite dissimilar species D. platysepalum.

The fruits are eaten for the sake of the pulp that forms the endocarp of the pod. In the *Indian Forester* for October 1896, it is stated that *Kranji* is one of the valuable timbers of the Straits Settlements. The scientific name cited in the notice is *D. indicum*; there is no species of that name. Perhaps the present species is intended; there is however nothing to show whether the tree referred to be this or some of the other species of *Dialium*.

4. Dialium laurinum Bak. in Flor. Brit. Ind. II, 269. A large tree with slender rugose dark-brown rusty-puberulous branchlets. Leaves alternate, odd-pinnate, 7-8 in. long; leaflets 7, rarely 5, subopposite, elliptic rather suddenly narrowed to a broad subobtuse or emarginate apex, base broadly rounded, 4-5 in. long, 1.75-2 in. wide, rigidly coriaceous, dark-green on both surfaces, glossy above, dull beneath, glabrous on both sides, secondary nerves 8-9 pairs oblique but not curved, faint above, rather prominent beneath and with there a distinct reticulate intermediate secondary venation; petiolules stout, glabrous, 3-4 in: long. Panicles terminal and axillary, 4 in. long, 3 in. wide, branches from 5 to 2 in. long, rusty-pubescent, pedicels 1 in long, usually in clusters of 3, silky. Calyx 15 in. long, ovoid-oblong in bud, tube subobsolete, segments 5 subequal much imbricate, oblong-lanceolate, densely grey-velvety on both surfaces. Petals 0. Stamens 2 opposite the upper calyx-segments, filaments very short, slender; anthers oblong.

Ovary silky, ovate, subsessile, style slender incurved, ovules 2. Pod almost orbicular, 1 in. across not apiculate, black, thinly coated with short grey-pubescence, the thin epicarp extremely fragile. Seed solitary, almost exactly orbicular, '5 in. across, '2 in. thick, reddish-brown, shining and smooth with fine rather wide-meshed reticulations on the surface. Ridley, Trans Linn. Soc. n. s. III, 294.

MALACCA; Ayer Panas, etc.; Maingay 539 (K.D.)! Goodenough 1321! SINGAPORE; Krangi, Ridley 6437! Pahang; Pigang, near Pekan, Ridley.

A very distinct species, easily recognised by its almost orbicular seed. Mr. Goodenough notes that this is known in Malacca as Krangi papan; he however quotes the same name as applied to a form of D. platysepalum. There are no Pahang specimens at Calcutta; the locality is cited from Mr. Ridley's paper on the Pahang flors.

DIALIUM MAINGAYI Bak. in Flor. Brit. Ind. II, 269. A large tree with spreading branches; branchlets slender lenticelled darkbrown, glabrous. Leaves alternate odd-pinnate, 4-5 in. long; leaflets 9, rarely 7, subopposite elliptic-oblong narrowed cuspidately to an obtuse or subacute entire apex, base rounded, 2-2.5 in. long, 75-1 in. wide, coriaceous, very dark-green shining above, dull and paler green beneath, glabrous on both surfaces; lateral nerves 4-5 pairs not visible above, faint and not raised beneath, scarcely more conspicuous than the very faint intermediate reticulate secondary venation; petiolules slender 2 in. long, glabrous. Panicles terminal, 4-5 in. long, 3 in. wide, branches 2 in. long, erecto-patent rusty-puberulous; pedicels 15 in. long, 2-3 together, rusty-puberulous. Calyx .25 in. long, ovoid in bud, tube very short campanulate, segments 5, or occasionally only 4, much imbricate, broadly ovate-obtuse, shortly brown-velvety silky on both surfaces. Petals 0. Stamens 2 opposite the two upper calyx-segments, filaments thick nearly as long as the auther, the connective beset with short brown hairs. Ovary black-velvety, ovate, shortly stipitate, style incurved glabrous; ovules 2, Pod widely obovoid, apex not apiculate, firm, 9 in. long, 8 in. wide, hardly at all compressed, densely persistently deep-olive velvety. Seed solitary, obovate-quadrate, finely longitudinally striate, shining, 45 in. long, 35 in. wide, 15 in. thick.

PERAK; Goping, Scortichini 2052! Upper Perak, 1000 feet, Wray 3407! 3767! PENANG; Tulloh Bahang, Curtis 440! 3031! MALACCA; Selandan, Goodenough 1533! SINGAPORE; Maingay 538 K. D. (Herb. Propr. 1398 A.)!

The seeds of this species are hardly distinguishable except in colour from those of D. indum, the fruits and the foliage are however extremely different. Curtis gives Krangi as the native name of this species in Penang; in Malacca the tree is said by Goodenough to bear the alternative names Kranji ambot and Kranji

The latter epithet is however also applied in Malacca to a form of the very different species D. platysepalum. No native name is cited with the Perak specimens or with the Singapore ones.

DIALIUM AMBIGUUM Prain. A tree 40-50 feet high, stem 5-8 in. in diam.; branchlets very verrucosely lenticelled, glabrous, blackish. Leaves alternate, odd-pinnate, 8-9 in. long; leaflets 7, opposite or rarely subopposite, oblong, rather abruptly shortly caudate-acuminate apex obtuse entire, base rounded, 4-5 in. long 1.5-1.75 in. wide, very rigidly coriaceous, bright-green, glossy and glabrous above, dull and faintly puberulous under the lens beneath; leaf-rachis glabrous; lateral nerves 9-11 pairs, fine, only visible beneath, forming distinct intra-marginal loops and with a fine intermediate reticulate secondary venation; petiolules glabrous 2 in. long. Panicles terminal and axillary, deltoid, slightly spreading, 5-8 in. long, 4-8 in. wide, branches 2-4 in. long very sparsely pubernlous with grey-silky hairs as is the main rachis; pedicels usually in clusters of 3, 15 in. long. Calyx 15 in. long, ovoid in bud, tube obsolete, segments 5, subequal, much imbricate, broadly triangular subacute, reflexed after flower opens; densely brown-velvety on both surfaces. Petals Q. Stumens 2, opposite the two upper calyx-segments; filaments thick and fleshy one-third as long as anther. Ovary light green-silky, ovate, quite sessile, tapering gradually into the glabrous style; ovules 2. Pod and seed unknown.

PERAK; Goping, 500-800 feet, Kunstler 6142! MALACCA; Bukit. Sadanen, Derry 510 (partly; only the specimens termed "Kranji")!

This tree is evidently very closely allied to D. platysepalum and may ultimately prove to be but a form of that variable species; if so, however, it is an exceedingly distinct variety, readily recognised owing to the differences in its ovary, in its pubescence, and in the arrangement of its leaflets. No native name is given for the Perak specimens; those from Malacca that appear to belong to the same

DIALIUM PLATYSRPALUM Bak. in Flor. Brit. Ind. II, 270. A tree 40-50 feet high; branchlets brown, closely-puberulous, sparsely lenticelled. Leaves alternate, odd-pinnate, 5-9 in. long; leaflets 5-7, usually conspicuously alternate, or rarely subopposite, elliptic or oblong to ovate-lanceolate, rather abruptly shortly candate-acuminate apex obtuse entire, base rounded or cuneate, 3-5 in. long, 1-2 in. wide, very rigidly coriaceous, dark-green glossy and glabrous above, densely shortly yellowish-brown silky beneath; leaf-rachis finely puberulous; lateral nerves 9-11 pairs, fine, only visible beneath, forming distinct intramarginal loops and with a fine intermediate secondary reticulate venation; petiolules puberulous 25 in. long. Panicles terminal and axillary, deltoid, close or slightly spreading, 5-8 in. long, 4-7 in. wide, branches 2-3 in, long, erecto-patent, finely brown-silky as is the mainrachis; pedicels usually in clusters of 3, '15 in. long. Calyx '2 in. long, ovoid in bud, tube rather distinct campanulate, segments 5, subequal, much imbricate, broadly triangular-obtuse, coriaceous, reflexed after flower opens, densely brown-velvety on both surfaces. Petals 0. Stamens 2, opposite the two upper calyx-segments; filaments thick and fleshy one-third to one-half as long as anther. Ovary black-velvety, ovate, shortly stipitate, gradually tapering upwards into the puberulous incurved style; ovules 2. Pod obovoid or orbicular, apex not apiculate, firm, spherical or slightly compressed, 1 in. long, '6-'8 in. across, '5-'7 in. thick; persistently brown-velvety. Seed solitary, orbicular, widely oblong or subrhomboid, pale-brown in fresh, darker in old specimens, finely longitudinally striate, '45 in. long, '35 in. wide, '2 in. thick.

Var. typica; leaves usually ovate-lanceolate, cuneate less often rounded at the base; filaments half as long as authors; pods orbicular very little compressed. D. platysepalum var. typica Bak. loc. cit.

PERAK; Larut, Wray 4019! MALACCA; Griffith 1847! Maingay 536! Sungei Udang, Holmberg 821! Bukit Sadanen, Derry 510 (partly; only the specimens termed "Sepan")! Merliman, Derry 89! Ayer Panas, Goodenough 1693! JOHORE; Machap, Goodenough 2000!

VAR. papan; leaves elliptic, rounded rarely curente at the base; filaments only one-third as long as anthers; pods orbicular very distinctly compressed.

Malacca; Ayer Panas, Holmberg 814! Derry 1225! Goodenough 1553!

VAR. burong; leaves oblong, rounded at base; pods clavately obovoid.

MALACCA; Selandan, Holmberg 855!

The tree here described as var. typica is also the typical variety of D. platy-sepalum as described by Mr. Baker. For reasons given under that plant, the present writer has found it necessary to treat Mr. Baker's var. Wallichii as a distinct species.

No native name is given for the specimens of *D. platysepalum* collected by Griffith, Maingay, and Wray. Holmberg gives its Malay name as merely 'Koran'; Derry for his n. 510 collected in 1890 (which, by the way, is quite different from his n. 510 collected in 1892) gives the name Sepan. For his n. 89 however Derry gives the name Krangi s' Kellat; the same name is used by Goodenough for his n. 1693. As explained under that species, Goodenough also uses this name, with the name Krangi ambot as an alternative one, for *D. Maingayi*; and it is true that though the flowers of *D. Maingayi* are quite different from those of *D. platysepalum*, their fruits are exceedingly alike and fruiting specimens of the two are only to be easily distinguished by the absence of pubescence from the leaves of *D. Maingayi*, the presence of a close golden-brown pubescence on the under-surface of those of *D. platysepalum*. Goodenough gives no native name for the Johore examples, which are quite like those from Perak and Malacca.

Whether the other two "varieties" here described are really separable as such, or whether, perhaps, they may not even prove to be distinct species, it is not, from the material at the writer's disposal, at present possible to decide. But field-botanists in the Peninsula should be able to settle the point satisfactorily for themselves.

Var. papan, so named because each of the three gatherings has been noted as bearing the Malay name Kranji papan, differs from the type only in the characters noted. Its facies, owing to its broadly elliptic leaves and its conspicuously compressed pods, is somewhat distinct, and it is rather noteworthy that all three gatherings have received the same native name, a name too that has been applied to no other form.

Van. burong, so named because it has been said by Holmberg to be termed Kranji burong by the Malays, has a still more distinctive facies owing to its pods being clavate, and because the pubescence on the under surface of its leaves is of a darker, somewhat brownish tint. Its leaflets too are in shape exactly like those of D. ambiguum. Still it does not seem possible to treat it as representing the fruit of D. ambiguum because in that tree the leaflets are almost exactly opposite and are very faintly puberulous beneath, in this they are conspicuously alternate and densely pubescent beneath. Its flowers have not been sent. The name Kranji burong, it should be noted, is used in Penang as an alternative one with Kranji padie, for D. indum.

8. DIALIUM WALLICHII Prain. A tree, branchlets brown, closely pubescent, slightly rugose, not lenticelled. Leaves alternate 7-8 in. long; leaflets 9-11, very conspicuously alternate, oblong-lanceolate, acuminate, apex acute, base cuneate, 2-2.25 in. long, 6-8 in. wide, coriaceous, bright-green glabrous above, densely shortly yellowishbrown-silky beneath; leaf-rachis softly pubescent; lateral nerves about 15 pairs, only visible beneath and there hardly more distinct than the faint intermediate secondary venation; petiolules pubescent I in. long. Panicles terminal and axillary, 6-8 in. long, 3-4 in. wide, branches 2-3 in. long, ascending, rather flexuous, softly pubescent as is the main rachis; pedicels 1 in. long. Calyx 2 in. long, ovoid in bud, tube distinct, segments 5, subequal, much imbricate, broadly triangular-obtuse, thinly coriaceons, reflexed after flower opens, densely greenish-velvety outside, inside white, glabrous. Petals 0. Stamens 2, opposite upper calyx-segments; filaments very thick less than one-fourth the length of anther, connective uniformly softly pubescent. Ovary brown-silky, distinctly stipitate, tapering into the slender, incurved, puberulous style; ovules 2. Pod obovoid 1 in. long, 75 in across, purplish-velvety. Seed solitary, subquadrate, indented near the micropyle; 4 in. long, 3 in. across, 15 in. thick, finely longitudinally striate. D. platysepalum VAR. Wallichii Bak. in Flor. Brit. Ind. II, 270. Connaracea Wall. Cat.

MALACCA; Muingay 540! SINGAPORE; Wallich 8534! Ridley!
This very distinct species agrees with D. platysepalum, of which Mr. Baker has

made it a variety, in having the same golden-brown pubescence on the under surface of its leaflets. But the smaller size of these leaflets; the shortness of the petiolules; the great difference in sepals, glabrous within in D. Wallichii, velvety within in D. platysepalum; and the equally marked differences in the fruit and the seed have led the present writer to treat it as a species apart.

DIALIUM KINGH Prain. A tree with spreading branches 100-150 feet high, stem 3-4 ft. in diameter; branchlets brown closely pubescent, slightly rugose, not lenticelled. Leaves alternate 8-9 in. long; leaflets 13-15, opposite except the terminal one, oblong-lanceolate, apex abruptly cuneate or rounded with an obtuse or retuse tip, base cuneate or rounded, 2-2.5 in. long, 6-8 in. wide, very rigidly corinceous, deep-green glabrous and shining above, rusty-pubescent beneath, leaf-rachis glabrous; lateral nerves about 10 pairs rather distinct, secondary intermediate venation faint; petiolules glabrous 1 in. long. terminal and axillary, deltoid, 6-8 in. long, 8-10 in. across, branches 3-4 in., erecto-patent, densely dark-brown velvety as is the main rachis; pedicels usually in clusters of 3, 25 in. long. Calyx 25 in. long, ovoid in bud, tube obsolete, segments 5, subequal, much imbricate, broadly ovate-obtuse, reflexed after flower opens; externally densely brownvelvety, inside waxy-white closely pubescent. Petals 0. Stamens 2 opposite upper calyx-segments, filaments very thick and fleshy, onethird as long as the bright-yellow anther; connective uniformly softly pubescent. Ovary densely brown-velvety, sessile, tapering abruptly into the incurved puberulous style; ovules 2. Pod irregularly spherical, '9 in. long, '75 in. across, velvety-black. Seed solitary, subquadrate, warm-brown, faintly longitudinally striate, 4 in. long, 5 in. wide, 2 in. thick.

Perak; Goping district, in hilly localities from 300-1000 feet, Knustler 4627! 8187!

No Malay name has been sent for this tree which is one of the most distinct and is perhaps the finest of the Peninsular species of Didlium. Its nearest ally is evidently D. Wallichii from which however its opposite leaflets, rusty-pubescent beneath, and its larger flowers at once distinguished it.

### 47. BAUHINIA Linn.

Unarmed erect trees, or climbers with circinate tendrils. Leaves simple usually more or less deeply cleft from the tip, rarely entire or fully divided into two leaflets. Flowers usually showy sometimes small, in copious simple or panieled often corymbose racemes. Calyx-tube with a disc produced to the top, sometimes long and cylindric, sometimes short and turbinate or campanulate, limb entire and spathaceous or cleft into 2 or 5 teeth, very rarely campanulate truncate. Petals 5 subequal usually with a distinct claw. Stamens 10, or reduced to 5.

or 3 or 1, if fewer than 10 with or without sterile filaments; filaments free filiform; anthers versatile dehiscing longitudinally. Ovary stalked, many-ovuled; style long or short, stigma small or large and peltate, subterminal or oblique. Pod linear or oblong, flat, continuous within, dehiscent or indehiscent. Seeds albuminous, funiculus usually broadly triangular. Species 150, spread throughout the tropics.

Fertile stamens 10, (flowers large showy):-Leaflets distinct; calyx with a produced tube and a 5cleft limb (§ Lysiphyllum); a very extensive cirrhose Leaflets connate; calyx with a short tube and a spatha-1. B. diphylla. ceous limb (§ PAULETIA); shrubs:-Lobes of leaves rounded; flowers yellow the upper petal with a central purple blotch; pod puberulous, not ribbed along upper suture ... Lobes of leaves subscute: flowers pure white; pod 2. B. tomentosa. glabrous ribbed along each side of upper suture Fertile stamens 3 :--... 3. B. acuminata. Calyx-tube produced (§ PHANERA) :-Buds narrowly clavate, the calyx-tube passing gradually into the limb; tendrils 0; (flowers large showy):-Erect; leaves glabrous above; calyx-limb spathaceous; pods glabrous Climbing; leaves pubernlous above; calyx-limb 4. B. purpurea. dividing into equal segments; pods pubescent Buds widely clavate, with a rather abrupt transition 5. B. mollissima. from tube to limb; tendrils circinate more or less plentiful :--Buds club-shaped—calyx-tube slightly ampullæformly dilated downwards, limb in bud obovate; anthers much longer than broad; (leaves of two connate leaflets with rounded or subacute apices):-Petals glabrous except on midrib and claw externally; (flowers long-pedicelled in pyramidal terminal corymbs) :--Stipules persistent; style glabrous ... Stipules deciduous; style densely pubescent ... 7. B. semibijida. Petals uniformly densely pubescent externally:-Petals much longer than calyx-lobes :-Flowers long-pedicelled in pyramidal lateral and terminal corymbs; leaves pubescent, (stipules large persistent orbicular) Flowers short-pedicelled in dense terminal 8. B. Hullettii. corymbs; leaves glabrous:-Stipules large persistent orbicular ... 9. B. Griffithiana. Stipules small deciduous Petals not longer than calyx-lobes; (leaves pubes-... 10. B. ferruginea. cent; corymbs terminal dense, flowers very shortly pedicelled) 176 ... 11. B. Ridleyi.

Buds clove-shaped—calyx-tube cylindric, limb in bud ovate or orbicular; anthers shortly oblong:-Leaves of two connate leaflets with rounded apices; ... 12. B. glauca. (calyx-tube considerably longer than limb) Leaves entire or divided at the tip (in young plants of some species casually split to the base) into two narrow acute or acuminate lobes :-Calyx-tube much longer than the limb; (leaves usually entire, less often divided at the tip, flowers in dense terminal corymbs) :-Leaves 5-7-nerved, adpressed-pubescent beneath; calyx rusty-downy; pod pubescent ... 13. B. cornifolia. Leaves 7-9-nerved, glabrous beneath; calyx ... 14. B. bidentata. sparsely puberulous; pod glabrous Calyx-tube not exceeding the limb :-Inflorescence lax, the lower flowers not at all deciduous; leaves thick firm :--Flowers in racemes, the lower pedicels not sensibly longer than those above :-Racemes long, many-fid; leaves all entire, glabrous beneath ... ... 15. B. lucida. \*\*\* Rucemes short, few-fld.; leaves rather deeply bifid, densely pubescent beneath ... 16. B. Scortechinii. Flowers in corymbs, the lower pedicels manifestly longer than those next above :-Leaves deeply cordate often subpeltate, not much longer than broad, sometimes 2-fid at tip, petiole 1 in. long ... 17. B. Kingii. Leaves shallow-cordate, twice as long as broad, all entire, petiole '5 in. long ... 18. B. Finlaysoniana. Inflorescence dense, most of the lower pedicels decidnous leaving the rachis below as a longish nodose peduncle; leaves thin flexible:-Leaves entire or rarely slightly emarginate at tip, 5-nerved; calyx glabrous; (pod glab-... 19. B. Wrayi. rous) Leaves divided at apex (only a few in region of inflorescence entire), nerves more than 5; calvx pubescent :-Leaves as broad as long, nerves 9-11, apical sinus wide deltoid; calyx rustypubescent; pod large pubescent . ... 20. B. integrifolia. Leaves longer than broad, nerves 7-9, apical sinus narrow; calyx grey-silky; pod small glabrons; flowers small ... 21. B. glabrifolia, Calvx-tube very short (§ LASIOBEMA); (flowers small, in long narrow many-fid. racemes) :--Calvx-limb 5-partite; petals white; pods small glabrous; leaves flexible, divided at apex :-Pod short, 2-seeded ... 22. B. anguina.

Pod longer, 3-5-seeded Calyx-limb entire; petals red; pods large densely pubes-... 23. B. Curtisii. cent (3-5-seeded); leaves rigid, entire

- ... 24. B. strychnoidea. § 1. Lysiphyllum Benth. Fertile stamens 10. Calya with a long tube and 5-cleft limb. Pod broad indehiscent. Leaflets distinct.
- 1. BAUHINIA DIPHYLLA Ham. in Syme, Embassy 476 c. Ic. (1800). A very extensive glabrous twining species with circulate tendrils, sometimes spreading 200-300 feet or further. Leaves cordate at base; leaflets always quite free, each 5-6-nerved, flexible, rounded at both ends, wider below, 3 in. long, 2 in across, pale-green glabrous on both surfaces; petiole glabrous '75-1.25 in. long, slightly thickened at both ends. Flowers very large, in lax terminal racemes 8-12 in. long, pedicels glabrous ascending 1.5-2 in. long, bracts small ovate squamous; buds 2 in. long fusiform. Calya thickly coriaceous, green, glabrous, limb cut to base into 5 lanceolate equal reflexed segments 1-2 in. long, tube 8 in. long very slightly infundibuliform. Petals lanceolate erect, clawed, equal, as long as calyx-lobes, 4 in. wide, white, faintly veined. Stamens 10, all fertile, equal, anthers linear, filaments as long as petals, glabrous. Ovary glabrous very long-stalked, style 5 in. long, somewhat incurved. Pod very large, thin and flat, 10-16 in. long, 3 in. wide, stipe 2 in. long, rather finely transversely veined. Seeds 30-40 in a row along the middle of the pod, oval, somewhat compressed, 5 in. long, 3 in. across, ·2 in. thick, testa pale-brown shining. Wall. Cat. 5784; Bak. in Flor. Brit. Ind. II, 278. Bauhinia Buchanani Desv. Ann. Sc. Nat., ser. I, IX, 430. Phanera diphylla Benth. Pl. Jungh. 264.

MALACCA; Griffith (fide Buker). DISTRIB. Burma; S. India.

This species is extremely plentiful in Burma but has never been sent to Calcutta from Malaya. It is inserted on the authority of Mr. Baker in the Flora of British

- § 2. PAULETIA Cav. Fertile stamens 10. Calyx with very short tube and spathaceous limb. Pod narrow dehiscent. Erect shrubs with large showy flowers and connate leaflets.
- 2. BAUHINIA TOMENTOSA Linn. Sp. Pl. 375. An erect shrub with downy zig-zag rounded branches. Leaves truncate at base, flexible, rather broader than long, 2-2.5 in. wide, 7-9-nerved, cut three-sevenths down into two rounded obtuse or faintly acute lobes, shining glabrous above, closely pubescent beneath; petiole pubescent, slightly grooved above, thickened at both ends, 5 in. long. Flowers in short-peduncled leaf-opposed 2-fid. (rarely 1- or 3-fid.) peduncles 4-1-2 in. long, pedicels erect 2 in. long, 2-bracteolate, bracts linear 25 in. long; buds narrowly ovate-acute, '7 in. long, the tip very shortly subulately 5-lobed. Calyx green, finely closely pubescent, splitting spathaceously to the base of

the '5 in.-long limb, tube '2 in. long, distinctly infundibuliform. Petals obovate-spathulate, 1.75 in. long, '8 in. wide, yellow, the upper with a purple central blotch. Stamens 10, all fertile, subequal, anthers linear, filaments hirsute in lower half. Ovary distinctly stalked, densely tomentose, style '5-'7 in. long, straight. Pod 4-5 in. long, '5-'7 in. across, compressed, at length dehiscent, when ripe only faintly puberulous, not ribbed along upper suture; stipe '2-'25 in. long. Seeds 10-16, oblong, flattened, '25 in. long, '2 in. across, testa dark-brown shining. Roxb. Hort. Beng. 31; DC. Prodr. II, 514; Roxb. Flor. Ind. II, 323; Wall. Cat. 5790 A-E; Bot. Mag. t. 5560; W. & A. Prodr. 295; Miq. Flor. Ind. Bat. 1, 75; Bedd. Flor. Sylv. 92; Bak. in Flor. Brit. Ind. II, 275. B. speciosa Roxb. in Wall. Cat. 5791 not of Vogel.

Penang; fide Baker. Andamans; King's Collectors! Distrib. S.-E.-Asia; Trop. Africa.

There are no Malayan specimens at Calcutta; the plant in the Andamans is, if not cultivated, probably introduced.

3. BAUHINIA ACUMINATA Linn. Sp. Pl. 376. A small erect shrub with obscurely downy zig-zag angular branches. Leaves slightly cordate, flexible, rather longer than broad, 3-6 in. wide, 9-11-nerved, cut onethird down into two triangular subobtuse or acute lobes, shining glabrous above, glaucescent hairy (sometimes at length glabrescent) beneath; petiole puberulous grooved above, thickened at both ends, 1-1.5 in. long. Flowers in leaf-opposed few-fld. corymbs, peduncle .5 in. long, pedicels erect the lowest '4 in. long, 2-bracteolate, bracts linear or subulate '15 in. long; buds lanceolate acuminate 1.5 in. long, the tip Calyx green, glabrous or faintly very shortly subulately 5-lobed puberulous, splitting spathaceously to the base of the 1.25 in.-long parallel-veined limb, tube 25 in. long, very slightly infundibuliform. Petals oblong, pure white, glabrous, 1.75 in. long, 1 in. wide. Stamens 10, all fertile, subequal, anthers linear, filaments hirsute in lower third. Ovary long-stalked glabrous, style '5 in. long, curved. Pod 4-5 in. long, 6-7 in. broad, firm, glabrous, compressed, at length dehiscent, strongly ribbed along each side of the upper suture, stipe '5 in. long. Seeds 10-15, ovate, flattened, 3 in. long, 2 in. wide. DC. Prodr. II, 513; Roxb. Hort. Beng. 31; Flor. Ind. II, 324; Wall Cat. 5794; W. & A. Prodr. 295; Miq. Flor. Ind. Bat. I, 74; Bak. in Flor. Brit. Ind. II, 276. B. candida Ait. Hort. Kew. II, 49; DC. Prodr. II, 513 not of Roxb. B. purpurea Wall. Cat. 5797 (D only) not of Linn.

Andamans; very common, King's Collectors! Perak; Kunstler 413! 2386! 8283! Scortechini 1812! Malacca; Hervey! etc. Distrib. China, India, Indo-China, Malay Archipelago.

§ 3. Phanera Lour. Fertile stamens usually 3, sometimes 4-5.

Calyx-tube usually more or less produced; limb 5 cleft or, very rarely, spathaceous. Erect or scandent; flowers variable in size.

4. BAUHINEA PURPUREA Linn. Sp. Pl. 375. An erect tree 20-30 feet high, with moderately stout glabrescent branches and without tendrils. Leaves roundish, base shallowly cordate, apex divided onethird to one-half down, sinus wideish, lobes rounded obtuse or subacute : rigidly subcoriaceous, 4-6 in. long and broad, medium green, glabrous above, paler and glabrous or faintly puberulous beneath; nerves 9-11; petiole 1.5 in. glabrous; stipules small membranous, triangular, 1 in. long, deciduous. Flowers in terminal and axillary short-peduncled fewfld. corymbs, 2-4 in. long; lower pedicels 25-5 in. long, puberulous as is the rachis, bracts minute deltoid, deciduous; buds clavate 1.5 in. long, tapering uniformly from the blunt apex to the base. Calya tawnydowny, limb '9 in. long, splitting into 2 coriaceous valves slightly divided at the apex into 5 short teeth, tube slightly dilated upwards 6 in. long. Petals 5, oblanceolate acute with long claw, white to purple, 1.75 in. long, 5 in, wide. Stamens 3-4 fertile, anthers linear-oblong, filaments white, as long as the petals. Ovary very long-stalked, puberulous, ovules 16-20, style stoutish 4 in. long, stigma rather large oblique peltate. Pod glabrous 8-12 in. long, 8-1 in. across, tardily dehiseing, valves firm woody flat, rather pointed at both ends, stipe l in long. Seeds 12-16, compressed, orbicular, 5 in. in diam. testa brown. Roxb. Hort. Beng. 31; Ham. in Trans. Linn. Soc. XIII, 497; Wall. Cat. 5797 in part; Roxb. Flor. Ind. II, 320; W. & A. Prodr. 296; Bedd. Flor. Sylv. 92; Bak. in Flor. Brit. Ind. II, 284. B. triandra Roxb. Hort. Beng. 31; Wall. Cat. 5799; Roxb. Fl. Ind. II, 320. B. coromandeliana DC. Prodr. II, 515. Phanera purpurea Benth. Pl. Jungh. 262; Mig. Flor. Ind. Bat. 1, 60.

SINGAPORE; Hullett 218! perhaps planted. DISTRIB.India; Indo-China; China.

5. Bauhinia mollissima Wall. Cat. 5782 (1830). A rather slender climber, usually small but sometimes reaching 60-80 feet in length, branches slender persistently rusty-tomentose; apparently always without tendrils: Leaves roundish, base cordate, apex divided one-third down, sinus wide, lobes obtuse; rigidly subcoriaceous, 4-6 in. long, rarely a little narrower than broad, bright-green; above persistently puberulous along the nerves, elsewhere densely papillose and velvety to the touch but ultimately not hairy, beneath thinly persistently rusty-pubescent; nerves 11-13; petiole 1·25-1·5 in., rusty-pubescent. Flowers in leaf-opposed racemes, peduncle subterete '5-2·5 in. long, compressed towards tip, densely rusty-tomentose, lower flowers usually deciduous, bracts persistent ovate-acute under '1 in. long, pubescent externally,

glabrous within; pedicels '25 in. long, rusty-tomentose, 2-bracteolate near the apex; buds narrowly clavate 2-2.5 in. long, the narrowly fusiform upper part rather shorter than the narrow slightly infundibuliform base. Calyx densely tawny- to rusty-tomentose limb splitting into reflexed equal linear-lanceolate lobes 1-1.25 in. long, tube 1-1.25 in. long. Petals 5, narrowly oblanceolate, the four lower 2 in. long, 3 in. wide, reddish-brown with a central yellow streak, the upper 2.25 in. long. 5 in. wide, bright-red with a central branching yellow line, all narrowed into a long claw and pubescent externally. Stamens 3 fertile, anthers linear-oblong, filaments yellowish, uniform, glabrous. Ovary densely tawny-pubescent, stalk '5 in. long, tomentose as is the style '7 in. long, stigma small peltate; ovules 4-6. Pod pubescent, 4 in. long, 1 in. wide, tapering to both ends, stipe '5 in. long. Seeds 1-2, compressed, orbicular, about 4 in. in diam. B. elongata Korth. Nat. Verh. Gesch. 89 t. 24 (1839); Bak. in Flor. Brit. Ind. II, 281. B. purpurea Zoll. & Mor. Syst. Verzeichn. 1; Nat. en Geneesk. Arch. III, 69, not of Linn. Phanera elongata Benth. Pl. Jungh. 262; Miq. Flor. Ind. Bat. I, 61. B. Pottsii G. Don, Gen. Syst. II, 462.

PERAK; Scortechini! Kunstler 1024! 2461! 5165! KEDAH; at Yau, Rilley 5206! PENANG; Porter (Wall. Cat. 5782)! MALACCA; Maingay 542/2! DISTRIB. Northwards to Tenasserim; southwards to the Malay Archipelago.

The name given by Korthals being of considerably later date than that employed by Wallich, Dr. Wallich's name is here adopted. Korthals' figure conveys a rather inaccurate idea of the colour of the flower, the true nature of which is given from a full field-note made by Mr. Kunstler.

6. BAUHINIA ALBO-LUTEA Prain. A slender shrubby climber with slender rusty-pubescent branches, tendrils few circinate glabrous. Leaves roundish, base cordate, apex divided one-third down, sinus narrow apiculate, lobes usually subacute; rigidly subcoriaceous, 2:5-4 in. long, often rather broader than long, dark-green; glabrous above, persistently puberulous, rarely closely pubescent, beneath; nerves 11-13; petiole 1.5-2.5 in, sparsely puberulous; stipules oblong-obtuse, ·2 in. long persistent. Flowers in few-flowered lax pyramidal terminal racemes, 3-4 in. long, 3 in. across, pedicels rusty-puberulous erectopatent the lower 1.5-1.75 in. long, bracts lanceolate 2 in. long, bracteoles subulate 15 in., deciduous; buds club-shaped, 9 in. long, the obovoid upper part exceeding the ampullæform base. Calya rusty-puberulous, limb splitting into reflexed lanceolate segments 5 in. long, 1 in. wide, tube '4 in. long, slightly dilated towards base. Petals cream-coloured. 5 subequal, oblanceolate subacute distinctly clawed, 1.25 in. long, 3 in. wide, glabrous within, and glabrous externally except on the claw and

along the lower third of the midrib. Stamens 3 fertile, anthers linear-oblong, filaments uniform 1.5 in. long. Ovary distinctly stalked, rusty-pubescent, style slender glabrous, 8 in. long, stigma oblique peltate. Pod thin oblong with black glabrous woody valves. Seeds 2 (fide Miquel). Bauhinia ferruginea Kurz Journ. As. Soc. Beng. XLV. 2. 128 (Enum. Pl. Nicobars); loc. cit. 289 (Burm. Flora) not of Roxb. Phanera albo-lutea Miq. Flor. Ind. Bat. I, 1079.

NICOBARS; Great Nicobar, Jelinek 241! DISTRIB. Indo-China; Sumatra.

It is rather strange that this species should occur in Burma, the Nicobars and Sumatra and not have as yet been gathered in the Malay Peninsula. It is nearer to B. semibifida than to B. ferruginea, with which Mr. Kurz has placed it, both on account of its long pedicels and because of its almost glabrous petals, but it differs very markedly as regards bracts and stipules as well as in its overy which has a glabrous style. Its nearest allies are, however, the Indian B. nervosa which differs in having pubescent petals, and the Sumatran B. stipularis Korth., which differs in having petals with cordate instead of cupeate bases.

7. BAUHINIA SEMIBIFIDA Roxb. Hort. Beng. 31. A very strong climber often exceeding 30 feet in length, with stems 4-6 in. thick; branchlets stoutish brightly rusty-silky, tendrils glabrous few, thick, woody, circinate. Leaves roundish, base cordate, apex divided one-third to one-half down, sinus narrow apiculate, lobes round or subacute; rigidly subcoriaceous, 2-3 in. long, sometimes a little narrower than broad, light-green and glabrous above, beneath with reddish rather densely rusty nerves, elsewhere sparsely adpressed-rusty silky; nerves 9-11; petiole 1-15 in., sparsely rusty-silky, stipules broadly ovate, falcate, 15 in. long, very deciduous. Flowers in pyramidal terminal racemes 4-10 in. long, 3 in. across, pedicels erecto-patent, rusty-pubescent, 1-15 in. long, bracts 2 in. long, lanceolate, deciduous; buds club-shaped 9-12 in. long, the obovoid upper part exceeding the ampullæform base. Calyx densely rusty-pubescent, limb splitting into reflexed lanceolate segments 5-7 in. long, 15 in. wide, tube dilated slightly towards base, 4-5 in. long. Petals 5 subequal, oblanceolate obtuse, shortly clawed, '8-1 in. long, '35 in. wide, dull, white, glabrous except on the claw and along the base of the midrib externally where there is a faint rusty pubescence. Stamens 3 fertile, authors linearoblong, filaments white, uniform, shorter than the petals. Ovary distinctly stalked densely rusty-silky, ovules 6-8, style thick silky stout, '4 in. long; stigma large oblique peltate. Pod thin oblong, with black glabrous woody valves, 4 in. long, 1.25 in. wide, stipe 35 in. long. Seeds 4-6, flattened, orbicular, 5 in. in diam. Wall. Pl. As. Rar. t. 253; Cat. 5783; Roxb. Flor. Ind. 11, 330; Wight Ic. t. 263; Bak. in Flor. Brit. Ind. II, 280. Phanera semibifida Benth. Pl. Jungh. 263; Miq. Flor. 182

Ind. Bat. I, 61. Banhinia ferruginea VAR. excelsa Bak. in Flor. Brit. Ind. II, 283; not Phanera excelsa Bl. Phanera sumatrana Miq. Flor. Ind. Bat. I, 1078

MALACCA; Griffith 1868; Mount Ophir, Lobb! SINGAPORE; Lobb! Maingay 542/3! Schomburgk 60! Hullett 55! 146! Kunstler 1251! Ridley! DISTRIB. Sumatra; Borneo.

This is very near indeed to B. ferruginea, but is easily distinguished by the pubescence on the outside of the petals being limited to a line on the centre near the base. I hanera excelsa Bl., from Borneo, reduced by Korthals to Bauhinia ferruginea is a quite distinct species, recently again reported by Hullett (n. 246). The Malacca specimen collected by Griffith which Mr. Baker refers to B. ferruginea VAR. excelsa is not at Calcutta, but Maingay 542/3 referred at Kew to the same variety is, at Calcutta, exactly the same as typical B. sumatrana Miq. and is therefore only a large form of B. semibifida. Another Maingayan sheet (n. 542/2, referred also to B. ferruginea VAR. excelsa) is, at Calcutta, the quite different B. mollissima Wall. (B. elongata Korth.).

8. BAUHINIA HULLETTII Prain. A strong shrubby climber reaching 20 feet in length, branchlets stoutish pubescent, tendrils few circinate pubescent. Leaves roundish, base cordate; apex divided one-third down, sinus narrow apiculate, lobes round; rigidly subcoriaceous, 2.5-4 in. long, rather longer than broad, dark-green sparsely pubescent above, paler and closely adpressed-pubescent beneath; nerves 9-11; petiole 1-1.5 in., densely pubescent; stipules orbicular hirsute foliaceous, 5 in. in diam., persistent. Flowers in lax few-fld. lateral leaf-opposed racemes, 3-6 in. long, 3 in. across, pedicels erecto-patent densely rusty-tomentose, 1.25-1.5 in. long, bracts lanceolate 25 in. long as are the linear bracteoles 15 in, long; buds club-shaped, 7-9 in, long, the obovoid upper part exceeding the ampulleform base. Calyx pubescent, rose-red as are the pedicels, limb splitting into reflexed lanceolate segments 4-5 in. long, 'I in. wide, tube slightly dilated towards base, 3-4 in. long. Petals rose-pink, 5 subequal, oblanccolate-obtuse, long-clawed, 1.25 in. long, '4 in. wide, far exserted, glabrous within, very densely tomentose externally. Stamens 3 fertile, anthers linear-oblong, filaments uniform pink. 2 in. long. Ovary distinctly stalked, densely silky, style thick tomentose stout, 12 in. long, stigma large oblique peltate. Pod unknown.

Penang; Curtis 784! J. Scott! Kunstler 1347! Perak; Wray 177! Malacca; Holmberg 775!

Very near B. Griffithiana but differs in having the stipules, though similar, very much smaller; in having the leaves pubescent instead of glabrous; in having long-pedicelled lax-flowered lateral corymbs instead of short-pedicelled dense-flowered terminal ones, and in having the flowers red or pink.

9. BAUHINIA GRIFFITHIANA Prain. A very strong shrubby climber reaching 20 feet in length, branchlets stout glabrous, tendrils few cir-

cinate, glabrous. Leaves roundish, base cordate, apex divided one-third down, sinus narrow apiculate, lobes round; rigidly subcoriaceous, 2.5-4 in. long, about as long as broad, dark-green shining above, paler beneath, quite glabrous on both surfaces; nerves 9-11; petiole 1-1.5 in. glabrous; stipules orbicular foliaceous, '75 in. in diam., persistent. Flowers in pyramidal terminal racemes 3.5-6 in. long, 3 in. across, pedicels spreading, rusty-pubescent, 4 in. long, bracts ovate 3 in. long, 25 in. wide, subpersistent as are the two similar subequal bracteoles; buds clubshaped 1 in. long, the broadly obovoid upper part exceeding the ampullæform base. Calyx rusty-puberulous, limb splitting into reflexed lanceolate segments 6 in. long, 15 in wide, tube slightly dilated towards base 4 in. long. Petals bright-yellow, 5 subequal, oblanceolate obtuse, shortly clawed, 1.25-1.5 in. long, 4-5 in. wide, glabrous within, densely tomentose externally. Stamens 3 fertile, anthers linear-oblong, filaments red, dilated in the middle, 2 in long. Ovary distinctly stalked, densely silky; ovules 6-8; style thick silky, stout, '6 in. long, stigma large oblique peltate. Pod thin, oblong, with black glabrous woody valves, 5 in. long, 1.5 in. wide, stipe .35 in. long. Seeds 4-6, flattened, ovate, 5 in. long, 35 in. across. Bauhinia ferruginea VAR. Griffithiana Bak. in Flor. Brit. Ind. II, 283. Phanera Griffithiana Benth. Pl. Jungh. 263; Miq. Flor. Ind. Bat. I, 65.

MALACCA; Griffith 1867! Maingay 542! Hervey! Derry 188! Holmberg 775! Perak; Scortechini 298! Pahang; Ridley 2606!

This agrees in foliage with B. ferruginea with which Mr. Baker has united it, and it has the same pubescence on the outside of the petals. But it differs considerably in flower and very markedly in the nature of its bracts and of its large persistent stipules and Mr. Bentham seems to the writer to have been undoubtedly justified in treating it as specifically distinct. It is in reality more nearly allied to B. Hullettii which has however pink flowers and pubescent leaves, and has the long-pedicelled flowers of B. semibifida and B. albo-lutea, than it is to the species in which Mr. Baker includes it.

10. BAUHINIA FERRUGINEA Roxb. Hort. Beng. 90. A very strong shrubby climber sometimes exceeding 20 feet, branchlets stoutish soon glabrescent, tendrils few circinate glabrous. Leaves roundish, base cordate, apex divided one-third down, sinus narrow apiculate, lobes round; rigidly subcoriaceous, 2.5-4 in. long, always about as broad as long, darkgreen, shining and glabrous above, paler and glabrous beneath; nerves 9-11; petiole 1-1.5 in., glabrous; stipules broadly ovate, falcate, 15 in. long, very deciduous. Flowers in pyramidal terminal racemes 3.5-6 in. long, 3 in. across, pedicels spreading, rusty-pubescent, 4 in. long, bracts ·2 in. long, lanceolate, deciduous; buds club-shaped 1 in. long, the broadly obovoid upper part exceeding the ampullæform base. Calyx rustypuberulous, limb splitting into reflexed lanceolate segments 6 in. long,

15 in. wide, tube slightly dilated towards base, 4 in. long. Petals pale greenish-yellow, 5 subequal, oblance olate-obtuse, shortly clawed, 1-1·25 in. long, 35 in. wide, glabrous within, densely tomentose externally. Stamens 3 fertile, anthers linear-oblong, filaments pink, uniform, 2 in. long. Ovary distinctly stalked, densely silky; ovules 6-8; style thick, silky, stout, 6 in. long, stigma large oblique peltate. Poil thin, oblong, with black glabrous woody valves, 8 in. long, 2 in. wide, stipe 5 in. long. Seeds 4-6, flattened, broadly ovate, 5 in. long, 4 in. across. Wall. Cat. 5776; Roxb. Flor. Ind. 11, 331; Bak. in Flor. Brit. Ind. 11, 283 excl. both the varieties and the syn. of Korthals and G. Don. Phancra ferruginea Benth. Pl. Jungh, 262; Miq. Flor. Ind. Bat. 1, 62.

PERAK; Wray 622! 1258! Scortechini 67! Kunstler 2508! 3492! 6173! PENANG; Porter (Wall. Cat. 5776)! Curtis 211!

This is very near to B. semibifida Roxb. but is at once distinguished by its petals being externally uniformly pubescent.

Bauhinia ferraginea Korth, referred by Mr. Baker to Roxburgh's plant, is an exceedingly distinct species. Korthal's plant is, in fact, the basis of Phancra excelsa Miq., which Mr. Baker elsewhere separates (as to citation) as a variety of B. ferruginea. The plant described as VAR. excelsa by Mr. Baker is, however, still another species (B. sumatrana Miq., which is only a form of B. semibifida). B. Pottsii G. Don, also referred here by Mr. Baker, has a tomentose pod and therefore cannot possibly be the present species. Don's plant is doubtless B. mollissima Wall, which is the only tomentose-fruited species at all nearly related to the present one.

11. BAUHINIA RIDLEY! Prain. A very strong shrubby climber reaching 20 feet in length, branches stoutish, thinly but persistently rusty-silky, tendrils few circinate persistently silky. Leaves roundish. base cordate, apex divided one-third down, sinus narrow apiculate, lobes usually subacute; rigidly subcoriaceous, 2.5-4 in. long, sometimes a little longer than broad, dark-green strigose above, densely adpressedpubescent beneath; nerves 9-11; petiole '75-1 in., densely rusty-pubescent; stipules ovate-lanceolate, falcate, '15 in. long, very deciduous. Flowers in densely congested terminal corymbs 2 in. long and broad, pedicels densely silky 3 in. long, spreading, bracts and bracteoles equal orbicular, persistent, densely tomentose, 25 in. long; buds club-shaped ·7 in. long, the obovoid upper part exceeding the ampullæform base. Calyx densely softly rusty-pubescent, limb splitting into reflexed lanceolate segments 4 in. long, 1 in. wide, tube 3 in. long, slightly dilated towards base. Petuls pure-white, 5 subequal, oblong-obtuse, hardly clawed, not exserted, glabrous within, densely tomentose externally. 4-5 in. long, 2 in. wide. Stamens 3 fertile, anthers crimson, linearoblong, filaments 75 in. long, uniform, red. Ovary shortly stalked, densely tomentose, style thick, tomentose, stont, 5 in. long, stigma large oblique peltate. Pod unknown.

PERAK; Scortechini 140! 519! Kunstler 1096! PENANG; Ridley! Curtis 1291! JOHORE; King and Hullett!

Very nearly related to B. ferruginea, B. Hullettii, B. Griffithiana, and like these species with petals densely pubescent outside; it is, however, easily recognised by its dense corymbs and by its short petals, not at all exserted.

12. BAUHINIA GLAUCA Wall. Cat. 5785. A spreading climber with glabrous sleuder branchlets; tendrils numerous circinate rusty-puberulous. Leaves cordate at base, bifid to the middle with obtuse lobes and a narrow sinus; firm, thinly coriaceous, rather broader than long, 2-3 in. across, glabrous above, thinly persistently adpressed rusty-pubescent especially on the nerves beneath; nerves 9-11; petiole 75-1-25 in long, stipules linear-subulate 2 in. long. Flowers in copious, dense, peduncled or very rarely subsessile, leaf-opposed and terminal corymbs, the peduncles sparsely rusty often 1-2 in. long, lower pedicels 5-75 in. long sparsely rusty, bracts and bracteoles linear-subulate, 15-2 in. long; buds clove-shaped 65 in. long, the ovoid head one-half shorter than the ridged cylindric base. Calyx glabrous, limb splitting into subequal ovateacute lobes 25 in. long, tube 4 in. long, puberulous within. Petuls 5 subequal, cream-coloured, oblong very long-clawed, wavy at the margin, ·75 in. long, sparsely pubescent externally. Stamens 3 fertile, anthers short-oblong, filaments white uniform glabrous, 9 in. long, exceeding the petals, declinate. Ovary glabrous with a distinct slender stalk and a stoutish style, 15 in. long, slightly incurved; stigma small; ovules about 20. Pod thin glabrous, flat, 6-8 in. long, 1.5-2.5 in. across, stipe 25-3 in. long. Seeds 15-20 in a line down the centre of the pod, much compressed, oval, 5 in. long, 3 in. wide. Bak. in Flor. Brit. Ind. II, 282. Phanera glauca Benth. Pl. Jungh. 265; Miq. Flor. Ind. Bat. I, 68, t. 2 A.

Perak; Scortechini 219! Wray 3332! Penang; fide Baker. Dis-TRIB. Indo-China; China; Malayan Archipelago.

The pods are like those of B. diphylla but smaller and with shorter stipe. Its nearest allies are the Chinese B. corymbosa with similar but smaller leaves and with similar flowers but with narrow pods, and the Assam B. tenuifora with similar pods but with less deeply bifid leaves and with a much longer calyx-tube. Mr. Baker has seen a variety from Singapore with smaller leaves (VAR. parrifolia); this has not

13. BAUHINIA CORNIFOLIA Bak. in Flor. Brit. Ind. II, 278. A very large slender creeper 100-150 feet long, stems 2-3 in. in diam., branches slender, thinly rusty-downy, tendrils few circinate downy. Leaves very slightly cordate at base, narrowed gradually to an obtuse or subacute entire or rarely bifid point, half as long again as broad, 2.5-3.5 in. long, 15-25 in. across, rather rigidly subcoriaceous, dark-green and glabrous above, thinly adpressed brown-silky beneath; 7- (rarely 5-) nerved; petiole 1 in. long, puberulous, slightly thickened at both ends. Flowers

in dense terminal corymbs, 4 in long and broad; pedicels rusty, erectopatent, the lower 1.75 in. long, bracts very small deciduous; buds cloveshaped, the cylindric base much longer than the spherical apiculate upper portion. Calyx rusty-downy, limb splitting into 5 subequal ovate shortly acuminate lobes 25 in. long, 2 in. across; tube cylindric 6-7 in. long. Petals 5 subequal, deep orange-yellow at length becoming brick-red, oblanceolate-oblong very shortly clawed, 8 in. long, 5 in. wide, externally sparsely rusty-pubescent. Stamens 3 fertile, anthers shortly oblong, filaments much shorter than petals. Orary densely rusty-downy, shortly stalked, style 2 in. long; stigma large peltate. Pod oblong woody, 4 in. long, 2 in. wide, externally finely adpressed rusty-pubescent; stipe 15-2 in. long. Seeds about 4, much compressed, dark-brown, 1 in. long, 7 in. across.

Penang; Griffith; Kurz! Hullett 123! Curtis 488! Malacca; Maingay 545! Perak; Kunstler 6261!

Very closely related to B. bidentala but differing in having larger flowers, pubescent pods, and leaves slightly downy beneath. The character derived from the leaf-apex, which appeared reliable when Mr. Baker's account of the Indian Bauhinias was published 20 years ago, is now proved, by the large suites of specimens sent to Herb. Calcutta during recent years, to fail within the limits of both of these species.

14. BAUHINIA BIDENTATA Jack, Malay. Misc. II, 7, 76. A very large strong creeper over 150 feet long, or sometimes, when growing apart, shrubby or even tree-like (Kunstler, Hullett), branches slender glabrescent, tendrils few circinate quite glabrous. Leaves very slightly cordate at base, sometimes truncate, narrowed gradually to an obtuse or sub-acute bifid or entire point, half as long again as broad, 2.5-5 in, long, 1.5-3.5 in. across, rather rigidly subcoriaceous, dark-green shining above. pale beneath, glabrous on both surfaces; 7-9-nerved; petiole 1 in. long. glabrous, slightly thickened at both ends. Flowers in dense terminal corymbs 3 in long and broad; pedicels finely pubescent, erecto-patent. the lower 1.5 in. long, bracts ultimately deciduous, ovate-acute, :15 in. long; buds clove-shaped, the cylindric base much longer than the spherical acute but not apiculate upper portion. Calyx puberulous, limb splitting into subequal ovate-acute lobes 3 in. long, 2 in. across; tube cylindric striate 1 in. long. Petals subequal, deep orange-yellow at length becoming scarlet, oblong, spreading, shortly clawed, '6 in. long, 35 in. wide, externally sparsely rusty-pubescent. Stamens 3 fertile, authers shortly oblong, filaments short hirsute. Orary sparsely pubescent, distinctly stalked, style 2 in. long, stigma large peltate. Pod oblong woody, 4.5 in. long, 1.5 in. wide, externally quite glabrous, stipe ·25 in long. Seeds 4-5, much compressed, ·5 in long, ·35 in wide. Hook. Comp. Bot. Mag. I, 223; Wall. Cat. 5778; Bak. in Flor. Brit. Ind. II, 279. Phanera bidentata Benth. Pl. Jungh. 263; Miq. Flor. Ind. Bat. I, 64.

Perak; Scortechini 93! 248! Wray 1628! Kunstler 803! 1000! 3130! 3183! 3528! 4797! 6533! Penang; Porter (Wall. Cat. 5778)! Hullett 181! Kunstler 1300! Curtis 136! Selangon; Ridley 318! Johore; King! Hullett 833! Distrib. Sumatra (Forbes!); Philippines.

Nearest to B. cornifolia Bak.

15. BAUHINIA LUCIDA Wall. Cat. 5779 A. A large creeper more than 100 feet long, with stoutish glabrous branches; tendrils long circinate glabrous. Leaves usually distinctly cordate at the base, tapering from below the middle to an ultimately abruptly shortly acuminate point; rather longer than broad, 3-5 in. long, 2-2.5 in. wide, rigidly subcoriaceous, bright-green shining above, glabrous on both surfaces, 5-(rarely 7-) nerved; petiole 3-4 in. long, glabrous. Flowers in lax long-peduncled copious paniculate racemes, terminal and extending into the axils of the upper leaves, 4-6 in. long, 2 in. across; pedicels rusty-puberulous, erecto-patent, subequal throughout the raceme, rarely exceeding '75 in. long, bracts lanceolate, deciduous, '2 in. long, bracteoles 2 subpersistent, subopposite, subulate, 15 in. long, near base of calyxtube; bud clove-shaped, the subcylindric base as long as the obovoid blunt upper portion. Calyx closely rusty-tomentose, limb splitting into subequal ovate-obtuse lobes 25 in. long, 2 in. across; tube subcylindric 25 in long. Petals subequal, bright-yellow, ovate-oblong, long-clawed, ·8 in. long, ·5 in. across, externally rusty-pubescent. Stamens 3 fertile. anthers shortly oblong. Ovary glabrous except on sutures near the base, stalk distinct pubescent; style :15 in. long, glabrous, stigma large peltate. Pod narrowly oblong, woody, 3.5 in. long, 1 in. wide, narrowing towards the base, valves glabrous; stipe 25 in. long, rusty-pubescent. Seeds 4-6, irregularly orbicular, compressed, 4 in. across. Bauhinia emarginata Bak. in Flor. Brit. Ind. II, 278 not of Mill. and hardly of Jack. Phanera lucida Benth. Pl. Jungh. 262.

PENANG; Porter (Wall. Cat. 5779)! PERAK; Wray 2127! Scortechini 66! 1534! Kunstler 3434! 3902! 6659!

Mr. Bentham and Mr. Baker both refer to this species B. emarginata Jack, from Sumatra. But Jack's plant has, by the original description, corymbose racemes with long pedicelled flowers and has tomentose ovaries. It is therefore quite clear that it cannot be the same as B. lucida Wall. In any case the use of the name 'emarginata' is to be deprecated, seeing that it was applied to a Mexican species (B. emarginata Mill. Dict., ed. VIII, 5) before Jack's name was published.

16. BAUHINIA SCORTECHINU Prain. A large climber with slender branches, glabrous except at the rusty-puberulous tips, tendrils long circinate puberulous. Leaves one and a half times as long as broad,

very shallowly cordate or truncate at base, from which they taper gradually to the junction of upper and middle third thence more abruptly to a bifid tip; 3.5-4 in. long, 2-2.5 in. wide, rigidly coriaceous, darkgreen and shining above, uniformly densely rusty-tomentose beneath; nerves 9, rarely 7; sinus '75 in, deep, very narrow; petiole 1.5 in, long, glabrous, thickened at both ends. Flowers in lax, few-fid., terminal short racemes under 2 in. long; pedicels and rachis rusty-pubescent, the former erecto-patent, subequal throughout, the lowest not exceeding 5 in.; bracts lanceolate subpersistent 15 in. long, bracteoles 2 subpersistent subopposite subulate, '15 in. long; bud '5 in. long, clove-shaped, the cylindric base as long as the spherical upper portion. Calyx closely rusty-tomentose, limb splitting into subequal ovate lobes; tube cylindric 25 in, long. Petals subequal ovate, externally densely rusty-tomentose (fully opened flowers not seen). Stamens 3 sometimes 4 fertile, anthers short oblong, filaments hirsute. Ovary rusty-pubescent, stalk and style distinct, the latter glabrous; stigma large peltate Pod not seen.

Perak; Scortechini 698!

This species is evidently very closely related to B. lucida with which it agrees altogether in inflorescence and largely in shape of leaf. It differs however in having the leaves densely tomentose beneath and in having them all deeply bifid at the tip. The colour of the flower has not been noted by Father Scortechini, but the petals, in the dried state, are exactly like those of the numerous species that are noted as having orange-yellow flowers which redden with age, and are unlike those petals that are noted as white. Owing to the absence of fully opened flowers the dimensions of petals and the lengths of stipe and style cannot be given.

17. BAUHINIA KINGH Prain. A small climber with slender zig-zag glabrous branches, tendrils circinate glabrous, often much thickened. Leaves deeply cordate often slightly subpeltate at base, narrowed gradually from the rounded basal lobes to an ultimately shortly acuminate emarginate or often deeply bifid rarely entire apex, rather longer than broad, 3.5-4 in. long, 2.5-3 in. wide, rigidly coriaceous. medium-green, glabrous and shining above, pale and puberulous along the nerves, very sparsely adpressed-pubescent elsewhere beneath; very uniformly 5-nerved, the nerves much branched outwards; petiole 1 in. long, glabrous. Flowers in lax, lateral axillary and terminal corymbs, 3 in. long, 2.5 in. broad, sometimes forming large loose leafless or leafy zig-zag panicles 6 in across and at times 1-15 ft. long; pedicels very sparsely puberulous, spreading, the lowest 1.25 in, long; bracts at base ·2 in. long, lanceolate; bracteoles near apex ·1 in. long subulate, both deciduous; bud clove-shaped, 5 in. long, the narrowly-infundibuliform base as long as the subglobose apiculate upper part. Calux closely rusty-pubescent, limb splitting into subequal ovate, very shortly acuminate lobes 25 in long, 2 in across; tube narrow-infundibuliform.

25 in. long, 15 in. in diam. at apex. Petals subequal, bright-red (Wray), oblanceolate-obtuse, long-clawed, '8 in. long, '25 in. wide, externally rusty-pubescent. Stamens 3 fertile, anthers shortly oblong, filaments hirsute. Ovary rusty-pubescent along sutures, long-stalked; style long, curved, puberulous, 25 in. long, stigma large peltate. Pod small, quite glabrous; woody, narrowly ovate, tapering to both ends, 2 in long, ·8 in. across; stipe ·2 in. long, pubescent. Seeds 1 or 2, ovate, compressed, 3 in. long, 2 in. across.

PERAK; Scortechini 320! on Gunong Batu Pateh, at 4500 feet, Wray 392! SELANGOR; Bukit Etam, Kellsall 2001! DISTRIB.

This is an exceedingly distinct species, more nearly approaching B. Finlaysoniana than any of the other Peninsular species, but amply distinct in the shape and colour of its flowers, the smaller size of its pods, the pubescence on its leaves beneath; also in the shape of the leaves and the type of nervation. 835, from Borneo, of which however there are only 2 leaves and one flower at Calcutta, appears to be the same.

BAUHINIA FINLAYSONIANA Grah. in Wall. Cat. 5801. A large 18. climber, over 100 feet long, branches slender glabrous, tendrils few circinate glabrous. Leaves slightly cordate at base, oblong, narrowed rather suddenly from above the middle to an obtuse or emarginate or acute point; about twice as long as broad, 3-5 in. long, 1.5-2.5 in. across, rigidly coriaceous, medium-green, glabrous on both surfaces, 5-(rarely 3-) nerved; petiole 3-4 in long, glabrous. Flowers in rather lax, terminal corymbs 3-4 in. long, 2-3 in. across; pedicels closely rustypubescent, erecto-patent, the lowest 1 in. long; bracts lanceolate, 15 in. long, deciduous; buds clove-shaped, the subcylindric base rather shorter than the ovoid-acute upper portion. Calyx densely rusty-tomentose, limb splitting into subequal ovate-acute lobes 25 in. long, 2 in. across; tube subcylindric, 2 in long. Petals subequal, creamy-white or pale yellow, orbicular, distinctly clawed, '6 in. long, '5 in. across, externally rusty-pubescent. Stamens 3 fertile, anthers shortly oblong. Ovary densely pubescent along sutures and on the distinct stalk, style short (·15 in.), glabrous, stigma large peltate. Pod (not quite ripe) linearoblong, woody, 2 in. long, 6 in. wide. Seeds 4-6. Bak. in Flor. Brit. Ind. II, 278. Phanera Finlaysoniana Benth. Pl. Jungh. 262.

Penang; foot of Government hill, Curtis 295! Perak; Scortechini 247! 1463! Kunstler 3589! Wray 2300! DISTRIB. Siam (Finlayson).

Mr. Bentham describes this as having almost glabrous petals; this is not the case in the Peninsular specimens. Both Mr. Bentham and Dr. Miquel doubt whether it be more than a form of B. lucida; it is, however, extremely distinct from that species and is much more nearly related to B. Kockiana Korth. (Verh. Nat. Geschied. 87, t. 10), which differs mainly in usually having 3-nerved leaves and in always having rather longer pedicels and a much longer calyx-tube. Dr. Finlayson's

specimens are said by Mr. Bentham to be from the Malay Archipelago, by Mr. Baker to be from the Peninsula; we know, however, from Dr. Wallich's correspondence that the majority of Finlayson's specimens, more particularly those without any definite locality, came from Siam.

BAUHINIA WRAYI Prain. A shrubby creeper 15-30 feet long, with slender glabrous branches and circinate glabrous tendrils. Leaves flexible, truncate very rarely cordate at the base, tapering from about the middle to an acute entire, very rarely an obtuse emarginate apex, rather longer than broad, 2-3 in, long, 1.25-1.75 in, across, mediumgreen, glabrous above, glaucescent glabrous or faintly puberulous only on the nerves beneath; very uniformly 5-nerved; petiole slender, glabrous, 5-6 in. long. Flowers in dense close-fld, terminal and axillary racemes, 2.5-4 in. long, the lower flowers deciduous except the few that become fertilised, the remaining terminal portion corymbose 2.5 in. long and broad; pedicels very slender, thickening in fruit, 1:35 in. long, sparsely rusty as is the slightly nodose main-rachis, bracts subulate ·2 in. long, very deciduous; bud clove-shaped, only ·2 in. long, the spherical minutely apiculate upper part in diameter equalling the length of the slender cylindric base. Calyx glabrous, tube 15 in. long, limb splitting into 5 spathulate subequal lobes 15 in. long. Petals pale greenish-yellow, or white at length pinkish, broadly oblanceolate, longclawed, 6 in. long, 2 in. across, margins slightly wavy, sparsely pubescent externally. Stamens 3 fertile, anthers shortly oblong. Ovary small, 3-4 ovuled, distinctly stalked, quite glabrous throughout, style '15 in. long, stigma small peltate. Pod obovate to oblong-obtuse, tapering to base, thin, woody, stipe 2 in. long, 2-3 in. long, 1 in. across, quite glabrous. Seeds 1-2, rarely 3, very much compressed, broadly ovate, 5 in. long, '4 in. across, testa dark-brown, dull.

Perak; Kanstler 2238! 2466! 4049! 5243! Scortechini 1652! Wray 1934! 2782! Selangor; Kunstler 8758!

Very distinct from any other Peninsular species, and by its inflorescence (in which it most resembles B. integrifolia among the Phaneras) connecting Phanera with Lasiobema, its small flowers approaching those of the latter section. It is extremely nearly allied to a Bornean species (represented by Mottley'n. 376 and Haviland n. 95) which differs in having deeply cordate leaves, in having quite glabrous pedicels, and in having the petals, though similarly crenulate, larger and almost glabrous. It is just possible that the Borneo plant may be the lost B. cordifolia Roxb.

20. Bauhinia integrifolia Roxb. Hort. Beng. 90. A large climber over 100 feet long, branches slender rusty-puberulous, tendrils circinate rusty. Leaves usually deeply cordate, always about as long as broad, mostly 4-6 in. across and with a deltoid apical sinus 4-6 in. deep; the leaves in the region of inflorescences usually small 1-25 in. long, 1 in. across, not infrequently entire; the leaves on young root-shoots

or seedlings paler and larger often 8 in. across, much broader than long with an obtuse angled sinus reaching nearly halfway down and with divergent deltoid lobes 3-4 in. long; thinly subcoriaceous, brightgreen, glabrous and shining above, at times brownish underneath especially on the nerves which are sometimes rusty-puberulous; nerves 11, very rarely 9; petiole glabrous cylindric thickened at both ends. usually 1.75-2.25 in. long, upper petioles in inflorescence 25-5 in. only; petioles of young shoots and seedlings sometimes exceeding 4 Flowers in terminal leafy panicles a foot long, the individual racemes dense close-fld., 3-6 in. long, the lower flowers deciduous except the few that are fertilised, the remaining terminal portion corymbose 3 in long and broad; pedicels very slender, thickening in fruit, 1.5 in. long, spreading, rusty-pubescent as is the nodose main-rachis; bracts very short, ovate-acute, sometimes persisting; bud clove-shaped, 35 in. long, the cylindric base slightly shorter than the ovate upper part. Calyx rusty-pubescent, tube '15 in. long, limb splitting into 5 subequal ovate acute lobes 2 in. long. Petals 5 subequal, bright-yellow passing with age to orange and brick-red, broadly obovate. long-clawed, 7 in. long, 3 in. wide, margins slightly wavy, very densely rusty-pubescent externally. Stamens 3 fertile, anthers shortly oblong. Orary 4-6-ovuled, densely pubescent, shortly stalked, style very long, 6 in., glabrous, stigma small peltate. Pod oblong, flat, woody, 7-8 in. long, 2.5 in. across, externally pubescent, stipe 15 in. long only. Seeds 3-5, very much compressed, broadly ovate, 9 in. long '7 in. across, margin deeply notched at micropyle; funicle flat triangular 5 in. long, 5 in. broad at base, narrowing obliquely to the hilum. Wall. Cat. 5780; Roxb. Flor. Ind. II, 331; Bak. in. Flor. Brit. Ind. II, 279. Phanera integrifolia Benth. Pl. Jungh. 263; Miq. Flor. Ind. Bat. I, 64 and Suppl. 286.

Pahang; Ridley 1360! 5023! Penang; Wallich 5780 B! Curtis 300! 500! 501! Prov. Wellesley; Kunstler 1608! Perak; Scortechini 98! 515! 1174! Kunstler 819! 964! 3585! 3947! 4897! 5538! Wray 46! Malacca; Maingay 541! 544! Hullett 89! Hervey! Derry 6! 76! 484! 1118! Holmberg 850! 866! Goodenough 1276! 1672! DISTRIB. Sumatra.

Like B. Wrayi this species serves to connect Phanera with Lasiobema. In Perak, Mr. Wray informs us, the Mulay name of this species is Dadau; he says that string and rope are made from the inner bark. Dr. Jack, on the other hand limits the name Dadaub, in Sumatra, to his B. emarginata. In Malacca there appears to be some dabiety as to the Malay name of the species, the following being those noted:—Akar Katop-Katop (Derry, 1118; Holmberg, 866; Goodenough, 1276): Akar tapak kuda merah (Goodenough, 1672): Sarau (Holmberg, 850): Panga Sarau (Derry, 484).

21. BAUHINIA GLABRIFOLIA Bak, in Flor. Brit. Ind. II, 281. A slender climber 50-80 feet long, stem 1.5 in. in diam., branchlets slender at first grey-silky, tendrils few short, circinate, woody, sparsely silky. Leaves truncate or shallowly cordate, very rarely deep-cordate at base, gradually tapering to an acute point, towards apex of twigs entire, lower down cleft at tip, with narrow sinus extending one-sixth to one-fourth down and with narrow acute lobes; the leaves of young plants and root-shorts bifid to the very base; rather longer than broad, 4-6 in. long, 3-45 in. wide, light-green, shining, quite glabrous above, when young pubescent on the nerves at length glabrous beneath; nerves 9 more rarely 7, in the quite 2-fid, leaves 3 or 4 to each lobe; petiole 1.25-2 in., glabrous. Flowers in terminal panieles, 8 in. long, 4 in. wide, of numerous dense short-pedancled many-flowered corymbs 2 in. long, 1.25 in. wide, pedicels erecto-patent 35-5 in. long, loosely grey-silky, bracts at bases of corymb-peduncles 2, stipellar, ovate-acute, 15 in. long, silky beneath, glabrous above, at base of pedicels solitary, lanceolate, persistent, 2 in. long, bractcoles about middle of pedicels 2, subopposed, subulate, '15 in. long; buds clove-shaped, the spherical subapiculate upper part longer than the narrowly cylindric base. Calux rather laxly grey-silky, limb splitting into spreading subequal ovate lobes with inturned tips, '25 in. long, tube '15 in. long. Petals small white, obovate, clawed, 3 in. long, densely grey-silky outside. Stamens 3 fertile, anthers very shortly oblong, filaments white slender glabrous, '5 in. long. Ovary densely silky especially along sutures, distinctly stalked, style glabrous slender, 2 in. long, stigma small. Pod (young) with silky sutures and glabrous valves; stipe 25 in. long. Bauhinia diptera Blume ex Miq. Anal. Ind. I, 12. B. piperifolia Kurz, John, As. Soc. Beng. XLV, 2, 288 not of Roxb. B. anguina Kurz, Journ. As. Soc. Beng. XLV, 2. 288 not of Roxb. Phanera diptera Miq. Flor. Ind. Bat. I, 70.

Perak; Scortechini 316! 1512 (spp. with distinct leaslets = B. diptera Bl.)! Kunstler 4311! 4511! 6170! Wray 3960! Penang; Curtis 801! 1541! Distrib. Tenasserim; Pegu; Borneo.

This is extremely nearly related to Bauhinia piperifolia Roxb. (Phanera glabrifolia Benth.) and has, indeed, been united with Roxburgh's species both by Mr. Kurz and by Mr. Baker. It is however very easily distinguished by its stipelliform mainbracts, not present in B. piperifolia; its much longer persistent bracts at base of pedicels; its pedicels less than half as long, with a spreading, not adpressed, tomentum; and its densely woolly ovaries, those of B. piperifolia being quite glabrous.

The oldest name is Baulinia diptera Bl. but as the term is applicable only to young leafy root-shoots or to seedling plants and is quite inappropriate when used in connection with flowering branches of adult plants, it seems much better to neglect it. When Mr. Baker's name is used, however, it has to be recollected

that it is merely the name which one employs, and that this can be done only because Baker has referred to his B. glabrifolia some Tenasserim specimens collected by Helfer that differ specifically from the plant he describes; both the diagnosis and the cited synonyms of the Flora of British India must be altogether excluded.

- § 4. LASIOBEMA Korth. Fertile stamens 3. Calyx with very short tube and equally 5-partite or entire truncate limb. Pod dehiscent or (B. anguina) indehiscent. Slender climbers with long narrow racemes of very small flowers.
- 22. BAUHINIA ANGUINA Roxb. Hort. Beng. 31. A woody climber with slender glabrous branchlets and circinate tendrils. Leaves ovate. base cordate, apex of upper leaves often entire, of the others very variably shallowly to deeply 2-fid, sometimes on young plants and rootshoots quite divided to the base with more or less divergent and more or less acuminate lobes; membranous, 2.5-5 in. long, 2-3 in. wide, brightgreen, shining, glabrous on both surfaces; nerves 5-7; petiole 1 in. long, glabrous. Flowers very small in many-fld. racemes arranged in terminal panicles often extending into axils of upper leaves, 6 in. long, as much across, individual racemes 2-4 in. long, 5 in across, pedicels spreading, equal, 15 in. long, very slender, faintly pubernlous as is the main-rachis, bracts minute linear; buds small spherical, '07 in. in diam. Calyx faintly puberulous, tube campanulate very short, lobes ovate '07 in. long, spreading. Petals oblauceolate, '12 in. long, puberulous externally, white. Stamens 3 fertile, filaments 1 in. long. Ovary distinctly stalked, glabrous, style slender 'l in. long, stigma minute. Pod thin flat oblong, glabrous, indehiscent, 1.5-2 in. long, 1 in. across. Seeds oblong, 6 in. long, 35 in, wide, only slightly compressed, long diameter in long axis of pod. Cor. Pl. III, t. 285; DC. Prodr. II, 516; Wall. Cat. 5773; Roxb. Flor. Ind. II, 328; W. & A. Prodr. 298; Bak. in Flor. Brit. Ind. II, 284. B. scandens Linn. Sp. Pl. I, 374 (as to Rheede's Malabar, not as to Rumphius' Malayan plant.) Lasiobema anguinum Korth. ex Miq. Flor. Ind. Bat. I, 71.

Malayan Peninsula; fide Baker in Flora of British India. DISTRIB. India; Indo-China; Malay Archipelago.

Mr. Baker notes this as being from the Eastern Peninsula; no specimens have been sent to Calcutta as yet. Dr. Miquel claims it also as a native of the Malay Archipelago; from this region likewise, no specimens have as yet been sent here; all those at Calcutta from the Archipelago belong to Lasiobema Horsfieldii Miq. This latter form Mr. Baker has reduced to B. anguina and the writer agrees with Baker in believing that the two plants are not specifically separable. At the same time he considers it better to treat L. Horsfieldii as varietally distinct, on account of its much smaller pods which are only 1-1.25 in. long, and 5-6 in. wide: Dr. Watt too has, in Herb. Calcutta, proposed for the plant the name B. anguina var. Horsfieldii Watt MSS. The point is here dwelt on because of the possibility that, when B. anguina is again collected in the Peninsula, it may prove to be this Sumatra and

Java VAR. Horsfieldii, and not the typical, larger fruited Indian variety, that is characteristic of the region.

23. BAUHINIA CURTISH Prain. A woody climber with slender very faintly puberulous branchlets. Leaves ovate-oblong, base rounded, apex divided at the tip into two short diverging deltoid lobes, sinus wide rectangular, a few of the smallest uppermost leaves entire at apex; membranous, 2.5-4 in. long, 2-2.5 in. wide, bright-green glabrous on both surfaces; nerves 5-7; petiole 1.25 in. long, glabrous. Flowers very small in terminal, simple, many-fld. racemes or panicles that extend into axils of upper leaves, 4 in. long and as much across, individual racemes 3 in. long, 1 in. across, pedicels spreading, equal, 5 in. long, very slender, faintly puberulous as is the main rachis, bracts minute linear; buds small ovate-acute, '15 in. long. Calyx puberulous externally, tube campanulate very short, lobes ovate-lanceolate spreading, 15 in. long. Petals spathulate, glabrous, '25 in. long, clawed, white. Stamens 3 fertile, filaments 35 in. long. Ovary shortly stalked, glabrous, style slender, '15 in. long, stigma minute. Pod thin flat, black, somewhat flexible, slightly recurved, quite glabrous, 2.5 in. long, 75 in. wide, stipe '07 in. long. Seeds 3-5, not seen quite ripe.

Kedan; Langkawi, Trutow, Curtis 1682! near the lake, Curtis 2619!

Very nearly related to B. Championii Benth., from S. China and the Eastern Himalaya, which has similar but rather larger pods. The present species, however, has longer pedicels, smaller buds, shorter calyx-lobes, a shorter stipe to the ovary and pod. The ovary here is also quite glabrous as are the leaves beneath; in B. Championii the ovary is somewhat silky, the leaves adpressed pubescent beneath. It is easily distinguished from B. anguina by the longer pods and pedicels. Mr. Cartis' specimens have no tendrils.

24. Bauhina struchholder Prain. A slender climber 60-80 feet long with stems only 1 in. in diam., branches slender glabrous, tendrils few very small circinate glabrous. Leaves ovate-acute, base cancate or rarely rounded, apex entire; rigidly subcoriaceous, 3-3.5 in. long, 1.5-2 in. wide, bright-green glabrous, polished above, dull beneath; nerves 5, the outer pair very slender the inner almost as strong as the laterally branching midrib with whose base they are usually more or less confluent; petiole '75 in., glabrous. Flowers small, in many-fld. racemes arranged in terminal panieles extending into axils of upper leaves, 8-12 in. long, 4-6 in. across, individual racemes 6-10 in. long, 2 in. wide, pedicels spreading, equal, '75 in. long, very slender, glabrous as is the main rachis, bracts minute linear; bads small, obovoid, '2 in. long, Calyx glabrous, tube campanulate very short, limb wide-campanulate '2 in. long and as much across, the entire margin truncate with 5 minute projections representing calyx tips. Petals spathulate, quite glabrous externally,

slightly pubernlous within along midrib, the upper rather longer subacute, the others obtuse 35 in. long, light-red, spreading. Stamens 3 fertile, filaments 3 in. long. Ovary very shortly stalked, densely pubescent, style 2 in. long, stigma large peltate. Pod thin flat densely velvety, 3-5 in, long, 2 in. across, valves woody; stipe very short. Seeds 3-5, ovate, dark-brown, 1 in. long, 6 in. across.

PERAK; Kunstler 5914! 7054! Scortechini! SELANGOR; Kwala Lampar, "top of the cave," Kelsall 1971!

A very remarkable species at once distinguished from any of the other Malayan ones by its leaves, which have the nervation of a Strychnos; and from all the hitherto known species by its truncate entire calyx. It might on this account be perhaps treated as the type of a new section. As regards fruit it might be placed in the section Phanera; as regards its other characters it agrees better with Lasiobema in which it is now placed.

# 48. CYNOMETRA Linn.

Erect unarmed trees. Leaves with few coriaceous odd-pinnate leaflets. Flowers copique, minute, in axillary corymbs or racemes. Calyx with a very short tube and subbasal disc; divisions 4-5, oblong, imbricated. Petals 5, oblanceolate, equal, not exserted. Stamens 10, or in C. polyandra indefinite, filaments erect, free, filiform, exserted; anthers small, oblong, versatile, dehiscing longitudinally. Ovary sessile or short-stalked, 2-ovuled; style filiform, stigma capitate. Pod turgid, oblique-oblong, with very thick indehiscent, usually rugose, tough, somewhat fleshy valves. Seed exalbuminous, central, filling up the cavity. Distrib. Species 20, spread everywhere in the tropics.

Stamens 10 (§ Eucynometra); leaf-rachis glabrous:-Flowers on stem and thick branches in racemes with a produced axis; pedicels glabrous; (leaves 1-jugate) Flowers among the leaves in racemes or corymbs without a ... 1. C. cauliflora. produced axis; pedicels puberulous:-Corymbs laxly umbelliform, bracts small very deciduous; pods rugose; leaves 1-2-jugate ... [Leaves 1-jugate 2. C. ramiflora. ... SUBSP. genuina; Leaves 2-jugate SUBSP. bijuga; End-leaflets acute much exceeding basal pair ... VAR. heterophylla, ... End-leaflets obtuse hardly exceeding basal pair ... . ... VAR. mimosoides.] Racemes dense subspicate, bracts subpersistent; pod smooth; leaves 3-jugate C. inaequali-Stamens 40-60 (§ Pseudocynometra); leaf-rachis puberulous; folia. (flowers in axillary corymbs; pedicels puberulous) Pod smooth 4. C. polyandra. 196

Pod very rugose, leaflets considerably larger ... VAR. ? Kurzii.]

§ 1. EUCYNOMETRA. Stamens 10.

1. CYNOMETRA CAULIFLORA Linn. Sp. Pl. 382. A shrub or small tree 8-16 feet high. Leaves even-pinnate, leaflets 1-jugate with petiole under 2 in. long or occasionally with one of the leaflets abortive, dimidiate-oblong to subfalcate-oblong, subsessile, 2-3 in. long, 75-15 in. wide, base cuneate, apex acute or subacute slightly notched, subcoriaceous, dark-green, glabrous on both surfaces, slightly shining above, lateral nerves few ascending not very prominent beneath, not visible Flowers in small elongated sessile racemes, '5-2 in. long, occasionally reduced to very short 2-3-fld. stalklets or to single flowers, clustered, rarely solitary, on rugose nodes on the stem, the bracts small concave-ovate, persistent, 'O5 in. long, glabrous, pedicels '2 in. long, slender glabrous, with small concave ovate basal bracteoles, 95 in. long. Calyatube very short, lobes 5, lanceolate, white, 15 in. long. Petals linear, 15 in. long, white or pink. Stamens 10, filaments 2 in. long, slender, glabrous. Ovary glabrescent, shortly stipitate, oblique; ovules 2. Pod thick and fleshy, oblong to irregularly globose, apiculate, glabrous, 1-2 in. long, edible. DC. Prodr. II, 509; Roxb. Hort. Beng. 32; Wall. Cat. 5816 A, B; W. & A. Prodr. 293; Mig. Flor. Ind. Bat. I, 77; Bak. in Flor. Brit. Ind. II, 268.

MALACCA; fide Baker. DISTRIB. Cultivated occasionally in India and in our area; generally in the Malay Archipelago.

2. CYNOMETRA RAMIFLORA Linn. Sp. Pl. 382. A medium-sized, spreading, sea-coast tree, 20-30 feet high. Leaves even-pinnate; leaflets 1-jugate with petiole under 2 in. long, or 2-jugate with rachis 1.25-2 in. long, the lowest pair always slightly, often much, smaller than the terminal, obliquely obovate-oblong to subfalcate-oblong, subsessile, 1-5 in. long, 25-2.5 in. wide, base obliquely cuneate, apex obtuse or shortly bluntly acuminate, coriaceous, dark-green, glabrous on both surfaces, shining above, lateral nerves numerous, spreading, rather distinet. Flowers in small subumbellate corymbs on small branches above the axils of fallen leaves, 3-6 in. long, the bracts small ovate, the outer ·15-2 in in diam, very deciduous, pedicels ·3-5 in long, very slender, finely puberulous, with small lanceolate basal bracteoles. Calyx-tube very short, lobes 5, ovate-lanceolate, white, 12 in. long. Petals white, linear-lanceolate, '15 in. long, much narrower than sepals. Stamens 10, filaments slender, 25 in. long, glabrous; anthers versatile. Ovary densely pubescent, subsessile, very oblique; ovules 2. Pod fleshy, strongly wrinkled, irregularly oblong or ovoid with a thick terminal fleshy tip, 5 in. long, 4 in. broad and nearly as thick. Seed oblong, 4 in. long, 3 slightly puberulous within along midrib, the upper rather longer subneute, the others obtuse 35 in. long, light-red, spreading. Stamens 3 fertile, filaments 3 in. long. Ovary very shortly stalked, densely pubescent, style 2 in. long, stigma large peltate. Pod thin flat densely velvety, 3-5 in, long, 2 in. across, valves woody; stipe very short. Seeds 3-5, ovate, dark-brown, 1 in. long, 6 in. across.

PREAK; Kunstler 5914! 7054! Scortechini! SELANGOR; Kwala Lampar, "top of the cave," Kelsall 1971!

A very remarkable species at once distinguished from any of the other Malayan ones by its leaves, which have the nervation of a Strychnos; and from all the hitherto known species by its truncate entire calyx. It might on this account be perhaps treated as the type of a new section. As regards fruit it might be placed in the section Phanera; as regards its other characters it agrees better with Lasiobema in which it is now placed.

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Pod very ragose, leaflets considerably larger .... VAR. P. Kurzii.]

- § 1. EUCYNOMETRA. Stamens 10.
- 1. CYNOMETRA CAULIFLORA Linn. Sp. Pl. 382. A shrub or small tree 8-16 feet high. Leaves even-pinnate, leaflets 1-jugate with petiole under 2 in. long or occasionally with one of the leaflets abortive, dimidiate-oblong to subfalcate-oblong, subsessile, 2-3 in. long, 75-1.5 in. wide, base cuneate, apex acute or subacute slightly notched, subcoriaceous, dark-green, glabrous on both surfaces, slightly shining above, lateral nerves few ascending not very prominent beneath, not visible above. Flowers in small elongated sessile racemes, 5-2 in. long, occasionally reduced to very short 2-3-fld, stalklets or to single flowers, clustered, rarely solitary, on rugose nodes on the stem, the bracts small concave-ovate, persistent, '05 in. long, glabrous, pedicels '2 in. long, slender glabrous, with small concave-ovate basal bracteoles, '05 in. long. Calyxtube very short, lobes 5, lanceolate, white, '15 in. long. Petals linear, '15 in. long, white or pink. Stamens 10, filaments 2 in. long, slender, glabrous. Ovary glabrescent, shortly stipitate, oblique; ovules 2. Pod thick and fleshy, oblong to irregularly globose, apiculate, glabrous, 1-2 in. long, edible. DC. Prodr. II, 509; Roxb. Hort. Beng. 32; Wall. Cat. 5816 A, B; W. & A. Prodr. 293; Mig. Flor. Ind. Bat. I, 77; Bak. in Flor. Brit. Ind. II, 268.

MALACCA; fide Baker. DISTRIB. Cultivated occasionally in India and in our area; generally in the Malay Archipelago.

2. CYNOMETRA RAMIFLORA Linn. Sp. Pl. 382. A medium-sized, spreading, sea-coast tree, 20-30 feet high. Leaves even-pinnate; leaflets 1-jugate with petiole under 2 in. long, or 2-jugate with rachis 1.25-2 in. long, the lowest pair always slightly, often much, smaller than the terminal, obliquely obovate-oblong to subfalcate-oblong, subsessile, 1-5 in. long, 25-2.5 in. wide, base obliquely cuneate, apex obtuse or shortly bluntly acuminate, coriaceous, dark-green, glabrous on both surfaces, shining above, lateral nerves numerous, spreading, rather distinct. Flowers in small subumbellate corymbs on small branches above the axils of fallen leaves, 3-6 in, long, the bracts small ovate, the outer ·15-·2 in. in diam., very deciduous, pedicels ·3-·5 in. long, very slender, finely puberulous, with small lanceolate basal bracteoles. Calyx-tube very short, lobes 5, ovate-lanceolate, white, 12 in. long. Petals white, linear-lanceolate, '15 in. long, much narrower than sepals. Stamens 10, filaments slender, 25 in. long, glabrous; anthers versatile. Ovary densely pubescent, subsessile, very oblique; ovules 2. Pod fleshy, strongly wrinkled, irregularly oblong or ovoid with a thick terminal fleshy tip. ·5 in. long, ·4 in. broad and nearly as thick. Seed oblong, ·4 in. long, ·3

in wide, 2 in thick. Lamk. Encyc. Meth. II, 240; DC. Prodr. II, 509: Bak in Flor. Brit. Ind. II, 267.

Subsp. genuina; leaves 1-jugate, leaflets subfalcate-oblong, shortly bluntly acuminate. C. ramiflora Miq. Flor. Ind. Bat. I, 78. C. ramiflora VAR. a W. & A. Prodr. 293.—Rumph. Herb. Amboin. I, t. 63; Lamk. III, t. 331 f. 2.

Not reported from our area. DISTRIB. Java, Horsfield 146 (erroneously distributed as C. bijuga)! Ceram, Teysmann 1961 (erroneously distributed as C. cauliflora)! Amboina, Rumphius (icon.)! Teysmann 5528!

Subsp. bijuga; leaves 2-jugate. C. bijuga Spanoghe, Linnaea XV, 201 (1841), name only.

a. VAR. heterophylla Thw. Enum. Pl. Zeyl. 97; terminal pair of leaflets acute or shortly acuminate, larger than the basal pair. C. bijuga Miq. Flor. Ind. Bat. I, 78. C. ramiflora Bedd. Fl. Sylvat. t. 315, not of Linn. C. polyandra Miq. Anal. Bot. Ind. I, 11, not of Roxb.

ANDAMANS; Coco Group, rare, Prain! S. Andaman coast, very rare, King! King's Collector! Perak; Matong, on the coast, Wray 2503! Jenore; Skudai River, Hullett and King! Singapore; Sungei Jurong, Ridley 5891! Distrib. Ceylon, (Walker)! Sumatra, (Forbes)! Java, Timor, Borneo.

β. Var. mimosoides Bak. in Flor. Brit Ind. II, 267; terminal pair of leaflets obtuse, emarginate or retuse, hardly larger than the basal pair; leaflets much smaller than in var. a. C. mimosoides Wall. Cat. 5817 (1830). C. ramiflora var. β. W. and A. Prodr. 293. Rheede, Hort. Malab. IV, t. 31; Lamk, Ill. t. 331, f. 1? (seems to show 1-jugate leaflets only).

ANDIANAS; very common in every tidal and beach forest. DISTRIB.

Malabar, Rheede (icon.)! Ceylon, Wallich (Cat. n. 5816 C in part; mixed with cultivated examples of C. polyandra from Madras and erroneously distributed as C. cauliflora)! Sundribuns; Arracan; Martaban and Tenasserim.

The three plants here included in *C. ramijlora* have been somewhat misunderstood by Linnens and indeed by most subsequent botanists. That the plant of Rumphius, here treated as sunsr. genaina, will have to be kept apart from the other two as a distinct species in any careful monograph of the genus seems to admit of little question. Though mentioned in many works as Indian, no one has ever sent Indian specimens to Calcutta; the only authors who have actually seen specimens that were not from the Malay Archipelago are Wight and Arnott, Thwaites, and Trimen; the specimens mentioned by these writers in every case came from Ceylon not from India. No one has ever sent it from the Malay Peninsula.

It is telerably certain that the two plants which form what is here termed 198

subsp. bijuga are not specifically separable, for some examples from the Andamans seem intermediate between the two. There are, however, no specimens that serve to link either of the forms with the 1-jugate subsp. genuina, and it will always be necessary to keep them apart as distinct—they are certainly very easily distinguishable—varieties.

Var. heterophylla is also said to be Indian; it is, however, only found in Indian gardens, though it does appear to be wild on the coasts of Ceylon. That var. mimosoides occurs in India seems likely from its having been figured by Rheede, though no one has ever collected it in Malabar again. It is, however, quite common in the Sundribuns at the northern end of the Bay of Bengal and extends from that area down the eastern side of the Bay as far as Tenasserim and the Andamans; it has never been reported from the Malay Peninsula or Archipelago, where var. heterophylla (C. bijuga Miq.) is the representative form. And just as the two forms grow side by side in the beach forests of the Andamans, so they both occur on the coasts of Ceylon, for a plant from 'frincomalee issued by Wallich under 5816/C is the same thing as his own C. mimosoides from the coasts of Burma. Wight and Arnott, too, say that they also have seen specimens from Ceylon which are the same as Rheede's Malabar plant; there is no doubt that Rheede's plant is Wallich's C. mimosoides.

In the event of subsp. bijuga being treated as a "species" of which heterophylla and mimosoides are only varieties, it must be noted that the name to be employed, from the point of view of priority, should be Wallich's, which is a decade anterior to Spanoghe's. But the adoption of Wallich's name will afford an excellent example of the disadvantage of the modern craze that insists on a rigid adherence to the laws of priority, Spanoghe's name being so much the more suitable of the two.

OTNOMETRA INEQUALIFOLIA A. Gray, Bot. U. S. Expl. Exped. 473. A lofty tree 150-200 feet high; leafy shoots at first enveloped in imbricating bracts. Leaves even-pinnate, rachis glabrous 2-3 in. long: leaflets 3-jugate, elliptic-oblong, base obliquely cuneate, inner side with the lower third to two-thirds of margin straight, narrower than outer with uniformly curved outline, apex subacuminate; rigidly coriaceous, dark-green, glabrous and smooth on both surfaces, shining above, lateral nerves 8-9 pairs very faint and hardly distinguishable from the secondary reticulations; sessile, 2-3 in. long, 1-1.25 in. wide, the lowest the smallest. Flowers in subcapitately congested axillary racemes 1-1.5 in. long, 1 in. wide, the closely imbricating bracts hard, striate, scarious, broadly ovate, 25 in. across, pedicels puberulous, 25-3 in. long, with two oblong membranous basal bracteoles 15 in. long. Calyx-tube very short, lobes 5, narrowly obovate, imbricate, ascending, '2 in. long, white. Petals 5, oblanceolate, white, '2 in. long, a little narrower than sepals. Stamens 10, filaments slender, 4 in. long, glabrous, anthers versatile. Ovary densely pubescent, shortly stipitate, very oblique; ovules 2. Pod. obovoid, thickly woody, obliquely obovoid, 2-2.25 in. long, 1.5 in. wide, '75 in. thick. Seed solitary, irregularly oval-oblong, 1.6 in. long, 1 in. broad, 5 in. thick. Bak. in Flor. Brit. Ind. II, 267.

MALACCA; Maingay 589! Derry 893! PROV. WELLESLEY; Tasek Gelugur, Ridley 6981! PERAK; Scortechini 2190! at Goping, Kunstler 6022! 6066!

§ 2. PSEUDOCYNOMETRA. Stamens 40-60.

CYNOMETRA POLYANDRA Roxb. Hort. Beng. 32. A large tree, the leafy shoots at first enveloped in imbricating bracts, the basal ones scarious 3 in. in diam., the inner membranous and reaching 2 in. long, l in. across. Leares even-pinnate, rachis puberulous 3-7 in. long; leaflets 3-jugate, elliptic-obovate or oblong, base obliquely cuneate, inner side with the lower half of margin straight, narrower than outer with uniformly curved margin, apex subacuminate, subcoriaceous, dark-green above, paler beneath, glabrous and smooth on both surfaces, hardly shining, lateral nerves 7-8 pairs more prominent beneath than the secondary reticulations, sessile, 2-5.5 in. long, 1-2.5 in. across, the lowest the smallest. Flowers in sessile axillary corymbs 2 in. long, 1.5 in. wide, the closely imbricating bracts hard striate scarious, broadly ovate, 3 in. across, soon deciduous, pedicels pubescent, 6-1 in. long with 2 very decidnous basal bracteoles. Calyx-tube very short, lobes 4, narrowobovate, imbricate, reflexed, 4 in. long, white. Petals 5, lanceolate, 4 in. long, narrower than sepals, white. Stamens 40-60, filaments slender, 5 in. long, glabrous, anthers versatile. Ovary densely pubescent, subsessile, very oblique; ovules 1-2. Pod oblique, oblong, woody, 2-2.5 in. long, 1.25-1.5 in. wide, smooth or rugose. Seed solitary, irregularly oblong, 1.5 in. long, 1 in. wide, 5 in. thick.

VAR. typica; pod smooth. C. polyandra Roxb. Hort. Beng. 32; Pl. Coromand. III, t. 286; Flor. Ind. II, 372; DC. Prodr. II, 509; Wall.

Cat. 5815; W. & A. Prodr. 294.

PENANG and MALACCA; fide Baker. DISTRIB. Khasia, Silhet.

Var. ? Kurzii; pod very rugose, leaflets rather larger. C. cauliflora Wall. Cat. 5816 E.

Penang; Jack (Wall. Cat. 5816 E)! Kurz! on Govt. Hill, "Apl. 1890" and "May 1893" Curtis! PERAK; Scortechini!

There are no specimens of C. polyandra proper from Penang or Malacca in Herb. Calcutta. The specimens of "VAR.? Kurzii," which may possibly prove, when fully represented, to be a distinct species, has been obtained in fruit by Kurz alone; all the other specimens are in leaf only; its flowers are, so far, unknown.

# 49. TAMARINDUS Linn.

A spineless tree. Leaves abruptly pinnate. Flowers in racemes. Calyx-tube turbinate; disc produced above its base; teeth lanceolate much imbricated, the two lowest connate. Petals only the three upper developed, the two lateral ovate, the upper hooded, the two lower

reduced to scales. Stamens monadelphous, only 3 developed, the others reduced to mere bristles at the top of the sheath; anthers oblong, versatile, dehiseing longitudinally. Ovary many-ovuled, with a stalk adnate to the calyx-tube; style filiform, stigma capitate. Pod linear-oblong, many-seeded, with a thin crustaceous epicarp and thick pulpy mesocarp. Seeds exalbuminous. One species, now planted everywhere in the tropics.

TAMARINDUS INDICA Linn. Sp. Pl. 34. A large unarmed tree with spreading branches, 40-60 feet high, stom 2-3 feet in diam., the young branchlets at first puberulous, elsewhere quite glabrous. Leaves evenpinnate, 2.5-6 in. long, leaflets 10-20 pairs rather close, oblong-obtuse, ·35-1·25 in. long, ·2-·3 in. across, glabrous on both surfaces, mediumgreen above, paler sometimes glaucescent beneath; coriaceous, subsessile, reticulate-veined; stipules linear, early caducous. Flowers in simple or panicled terminal or lateral racemes 2-4 in. long, bracts concave, caducons, 25-3 in. long, obovate-elliptic, pedicels articulated under the base of calvx, slender, 25 in, long, glabrous; bracteoles small with puberulous margins. Calyx 5 in. long, faintly puberulous, tube narrowly turbinate, 2 in.; limb 4-partite, segments subequal, 3 in. long, 2 in. wide, ovate-acute, entire, much imbricated, membranous. Petals 3, an upper and two lateral, yellowish with pink stripes, obovate-oblong, subequal, 4 in. long, slightly exceeding calyx-limb, '25 in. across, slightly narrowed to a short claw; the two lower petals replaced by small scales. Stamens 3 fertile, anterior, connate nearly half their length, alternating with rudimentary bristle-like staminodia; anthers oblong, versatile. Ovary stipitate, style ruther short equalling the stamens; stigma terminal, obtuse, slightly thickened; ovules 8-10 or more. Pod linear-oblong, nearly straight, thickened, subcompressed; 3-8 in. long, 1 in. wide, 4 in. thick; outer layer of pericarp thin, crustaceous, scurfy; middle layer pulpy, acid, traversed by fibres. Seeds 3-10, obovate-elliptic, compressed, '6 in. long, '4 in. wide, '2 in. thick; testa thick shining, sides areolate. DC. Prodr. II, 488; Roxb. Flor. Ind. III, 215; Wall. Cat. 5824; W. & A. Prodr. 285; Miq. Flor. Ind. Bat. I, 82; Bak. in Flor. Brit. Ind. II, 273; Oliver, Flor. Trop. Africa, III, 307. T. occidentalis Gaerta. Fruct. II, 310, t. 146; DC. Prodr. II, 488. T. umbrosa Salisb. Prodr. 323. T. officinalis Hook. Bot. Mag. t. 4563.

ANDAMANS; Great Coco Island, introduced by the sea, not planted, Prain! Kedah; "growing wild at the top of limestone hills," Kunstler 1728! Selangor; "in dense old jungle," Kunstler 8613! DISTRIB. Planted throughout the tropics; believed by Oliver to be truly indigenous in Africa.

## 50. SINDORA Miq.

Unarmed lofty trees. Leaves abruptly pinnate; leaflets few rigidly

coriaceous. Flowers small, panicled. Calyx with a very short tube and basal disc; segments 4, valvate or very slightly imbricated. Petal 1, the size and shape of the upper calyx-segment. Stamens 10, the upper free and without anther, the others declinate shortly monadelphous, hirsute, unequal, the two nearest the free staminode always fertile, rather larger than the rest which are alternately short and long and may casually have sterile anthers or none; anthers oblong, versatile, dehiscing longitudinally. Ovary 2-5-ovuled, short-stalked, pubescent; style long, filiform, circinate, stigma small terminal capitate. Pod more or less oblique, broadly rounded-oblong, dehiscent, the valves flat, hard and woody, armed or not all over the face with straight, conical, firm prickles. Seeds usually 2, rarely 3-5, with a hard shining testa and resting on the cupshaped apex of a thick obconic arillate funiculus. Species 9; eight Malayan, one Cambodian.

The earliest publication of any species of this genus was in Rumphius, Herb. Amboin. II, t. 13. It thus forms, by citation, a part of the genus Galedupa Lamk. (Encyc. Meth. II, 594 [1786]); it is not, however, covered by the description of Galedupa indica given by Lamarck; that description applies only to the Pongam of Rheede (Hort. Malab. VI, t. 3), now known as Pongamia glabra Vent. As this latter name is validly established-Rheede's genus having been published by Adanson as Pongam, before it was mistaken by Lamarck for Galedupa—it may be one day found necessary to restore Lamarck's name Galedupa indica and restrict it to Rumphins' Caju Galedupa. In any case Galedupa is the generic name first applied to, and therefore, by the modern canons, the one that should be used for what is at once Sindora Miq., Echinocalyx Benth., and Grandiera Lefevre. The writer, be it understood, is of those who consider our modern priority-hunting to be frequently unwise; this consideration will probably be shared by sober-minded students who, after reading what is said here and what has been already said under Pongamia, may take the trouble to examine the treatment that adepts in the art are prepared to accord the names now under discussion.

The genus is not a member of the tribe Cynometrex but of the Amherstiex, where it has to be placed close to the genera Pahudia Miq. and Afzelia Linn. Pahudia is in fact almost exactly intermediate between Sindora and Afzelia since it combines the thinner leaves and the much imbricated sepals of the latter, with almost the pod and exactly the seeds of the former. The stamens in both Pahudia and Sindora are similarly united in a sheath, but there is the curious difference that the two nearest the fissure are abortive and represented by bristles on the tube in Pahudia, whereas in Sindora these are fully developed and in some of the species are at times the only fertile stamens present.

Pods armed on the face with strong straight prickles (anknown in S. velutina); leaves puberulous or pubescent beneath:—

Pods subequally rounded at base, style and beak at opposite ends of its long axis; rachis of raceme straight with spirally-set bracts and flowers:—

Stipules large foliaceous; calyx-lobes with a few spines outside in their upper third

... 1. S. Wallichiana.

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Stipules inconspicuous; calyx-lobes rather densely spinescent outside in their upper two-thirds Pods obliquely rounded at base, beak projecting laterally at right angles to direction of stalk (unknown in S. velu-

tina); rachis of raceme zig-zag with subdistichously-set bracts and flowers :-Leaflets 3-jugate, puberulous beneath; calyx-lobes

slightly spinescent in their upper third outside Leaflets 5-6-jugate, densely pubescent beneath; calyxlobes not spinescent

3. S. intermedia.

2. S. Echinocalyz.

4. S. velutina.

Pods unarmed; leaves glabrous beneath; (pod subequally rounded at base, calyx-lobes not spinescent)

... 5. S. coriacea.

SINDORA WALLICHIANA Benth. A large tree with slightly rustypubescent branchlets. Leaves equally pinnate with puberulous rachis 4-6 in. long, stipules very large foliaceous semi-lunar sub-intrapetiolar. ·6 in, long, acute at apex, rounded auriculate at base, pubescent on both sides; leaflets 3-jugate, oblong, apex round or acute, base round or cuneate, 1.5-3.25 in. long, 1 in. wide, the lowest pair slightly the smallest, very coriaceous, shining glabrous above, dull uniformly pubescent beneath, nerves numerous close horizontal slightly irregular, faint beneath not visible above, petiolules 2 in. long, puberulous. Flowers in axillary and terminal lax panicles 6-8 in. long, 5-6 in. wide, individual racemes 3-4 in. long with straight pubescent rachis, flowers spirally arranged, bracts broadly ovate-obtuse, 4 in. long, densely pubescent beneath, sparsely puberulous above, pedicels 35 in. long, with two ovatelunceolate bracteoles, 2 in. long, at the apex; buds oblong densely pubescent, 4 in. long. Calyx-tube short, lobes 4, thick, 25 in. long, densely strigose within, ovate-acute, valvate, sparingly spinescent externally in the upper third. Petal 1, as long as the calyx-lobes, inside densely hairy. Staminal-sheath and filaments declinate pubescent. Ovary very hirsute, style twisted, stigma capitate. Pod broadly oblong, subequally rounded at base so that the short stout straight beak projects in the direction of the long axis, 3 in. long, 2 in. across; valves dehiscent, puberulous, woody, uniformly armed on the outside with strong straight conical spines 15 in. long. Seeds usually 2, with arillate funicle. Sindora Wallichii Benth. in Hook. Icon. Plant. t. 1018 not t. 1017; Bak. in Flor. Brit. Ind. II, 268 in part, excl. syn. Echinocalyx Bth. and both Guilandina Wallichiana Grah. in Wall. Cat. 5805. Galedupa Wallichiana Prain MSS.

SINGAPORE; Wallich 5805! Kurz! T. Anderson 41! MALACCA; Griffith!

The Griffithian specimens referred to were given by Dr. Griffith to Dr. McClelland; from his collection they passed into the Calcutta Herbarian under Griffith's original name "Cassia sp." They were afterwards examined by Dr. T.

Thomson, who referred them to the genus Schotia which is much nearer their real position. They are very distinct, by reason of their less spiny calyx-lobes and their large foliaceous stipules, from another Griffithian gathering from Malacca, first issued from Kew as n. 1848 under the name "Dialium? sp." and subsequently made by Mr. Bentham the type of his genus Echinocalyz. When afterwards referring Griffith n. 1848 and Wallich n. 5805 to one species, Mr. Bentham, who apparently had only Wallich's specimens at his disposal, did not know that the Singapore plant has large foliaceous stipules.

SINDORA ECHINOCALYX Prain. A large tree with glabrescent branchlets. Leaves equally pinnate with puberulous rachis 2-3 in. long, stipules small; leaflets 3-jugate oblong, apex round or slightly acute, base round or slightly cuneate, 1.25-2 in. long, 75-1 in. wide, the lowest pair slightly the smallest, very coriaceous, shining glabrous above, dull minutely puberulous beneath especially on the midrib, nerves numerous close horizontal slightly irregular, faint beneath not visible above, petiolules 15 in. long, puberulous. Flowers in axillary and terminal lax panieles 4-5 in. long, 2-5-3 in. wide, individual racemes 1-25-1-5 in. long, with straight puberulous rachis, flowers spirally disposed, bracts ovateobtuse 25 in long, glabrescent above, puberulous beneath, pedicels 25 in. long, puberulous, with two oblanceolate bracteoles, '2 in. long, at the apex; buds oblong, puberulous, 3 in. long. Calyx-tube short, lobes 4 thick, 2 in long, pubescent inside, ovate-acute, valvate, rather densely uniformly spinescent externally in the upper two-thirds. pubescent internally. Staminal-sheath and filaments declinate, hairy. Ovary very hirsute, style curved, stigma capitate. Pod broadly oblong, subequally rounded at base so that the slender straight beak projects in the direction of the long axis, 2.25 in. long, 1.5 in. across; valves dehiscent, puberulous, thinly woody, uniformly armed on the outside with strong straight conical spines 15 in. long. Seeds 2, funicle arillate. Wallichii Benth. in Hook. Icon, Plant. t. 1017, not t. 1018 and not Guilandina Wallichiana Grah. S. Wallichii VAR. ovalifolia Maingay MSS. Echinocalyx Benth. in Benth. & Hook. f. Gen. Pl. I, 584. Galedupa Echinocalyz Prain MSS.

Managoa; Griffith 1848! Maingay 562/1!

Nonrest to S. Wallichiana but easily distinguished by its less pubescent leaves, different stipules, and smaller flowers with more spinescent calyx.

3. SINDORA INTERMEDIA Baker. A large tree, over 100 feet high, with slightly rusty-tomentose branches. Leaves equally pinnate, with puberulons rachis 4-6 in. long, stipules small; leaflets 3-jugate, oblong, apex round or slightly acute, base round or slightly cuneate, 1.5-2.5 in. long, 1 in. wide, the lowest pair slightly the smallest, very coriaceous, shining glabrous above, dull minutely pubernlous beneath especially on the midrib, nerves numerous close horizontal slightly irregular, not very

conspicuous beneath, not visible above, petiolules '15 in. long, puberulous. Flowers strongly scented, in axillary and terminal dense panicles, 4-6 in. long, 2.5-3 in. wide, individual racemes 2 in. long with subcrect zig-zag rusty-tomentose rachis, flowers subdistichous, bracts ovate-acute 3 in. long, densely puberulous beneath, sparsely so above; pedicels 35 in. long rusty-tomentose, with two ovate-lanceolate bracteoles, 2 in. long, at the apex; buds oblong densely pubescent, 4 in. long. Calyx-tube short, lobes 4, thick, 25 in. long, very densely strigose on the inside, ovateacute, valvate, sparingly spinescent externally in the upper third. 1, reddish, as long as the calyx-lobes, densely hairy. Staminal-sheath and filaments declinate, red with rusty hairs; perfect anthers 9. Ovary very hirsute, style twisted, stigma capitate. Pod wide-oblong, obliquely rounded at base so that the small recurved beak projects laterally at right angles to direction of stalk, 2 in. long, 2.5-3.5 in. across; valves dehiscent, puberulous, woody, uniformly armed on the outside with strong straight conical spines '2 in. long. Seeds usually 2, rarely 3-5, with hard black shining testa, oblong, horizontal, '5 in. long, '75 in. across, resting on a basal, arillus-like, thick obconic funiculus about '75 in. long. Sindora Wallichii VAR intermedia Bak. in Flor. Brit. Ind. II, 268. S. Wallichii Scortechini MSS, not of Benth. Galedupa intermedia Prain MSS.

PANGKORE; Gunong Tungal, Curtis 1630! Scortechini 1064! MALACCA; Maingay 562! PERAK; Scortechini!

This is at once distinguished by its transverse pods from both of the species placed under S. Wallichiana by Mr. Bentham. Mr. Curtis gives the Malay name of this in Pangkor as "Sapetir."

Two other species with similarly oblique pods are S. sumatrana Miq. and S. cochinchinensis Baill.; it is just possible that S. velutina Bak, may prove to share the character and to belong to the same group.

4. Sindora velutina Bak. in Flor. Brit. Ind. II, 269. A large tree with densely tawny-tomentose branches. Leaves equally pinnate with sparsely pubescent rachis 5-7 in. long, stipules not seen; leaflets 5-6-jugate, oblong, apex subacute or acute, base round or slightly cuneate, 2:5-3:5 in. long, 1-1:75 in. wide, the lowest pair rather the smallest, very coriaceous, shining glabrous above, dull densely uniformly softly pubescent beneath, nerves numerous close horizontal slightly irregular, very faint beneath, not visible above, petiolules 1 in., densely pubescent. Flowers in axillary and terminal lax racemes 5-7 in. long, 3 in. wide; individual racemes 2 in. long, with zig-zag densely tawny-pubescent spreading rachis, flowers subdistichous, bracts ovate-acute, 3 in. long, densely tawny-tomentose, pedicels 15 in. long, densely tomentose as are the two lanceolate bracteoles; buds oblong, densely pubescent, 4 in. long. Calyx-tube short, lobes 4, thick, 25 in. long, densely hairy

within, ovate-acute, valvate, without spines externally. Petal 1, as long as calvx-lobes, densely hairy. Staminal-sheath and filaments declinate hairy. Ovary very hirsute, oblique; style twisted, stigma capitate. Pod not yet known. Galedupa velutina Prain MSS.

MALACCA; Maingay 607!

Of this very distinct species the only specimens hitherto collected are Maingay's. One of these has been very kindly placed at Dr. King's disposal, for purposes of description, by the Director of the Royal Gardens, Kew. There is no doubt as to its affinity being greatest, as Mr. Baker has already indicated, with S. intermedia, and though it is as yet impossible to say if the pod is marked by the presence or absence of spines, it is very probable, from the obliquity of the ovary, that it has a transverse pod like S. intermedia and S. sumatrana.

5. SINDORA CORIACEA Prain. A large tree with glabrous branches. Leaves equally pinnate with glabrous rachis 5-6 in. long, stipules small; leaflets 4-jugate, oblong, apex rounded or subscute, base round or slightly cuneate, 2-3 in. long, 1.25-1.5 in. wide, the lowest pair rather the smallest, very coriaceous, shining glabrous above, dull glabrous beneath. nerves numerous close horizontal slightly irregular, very faint, petiolules 15 in. glabrous. Flowers in axillary and terminal lax panicles 8-10 in. long, 4 in. wide; individual racemes 2 in. long, with straight, thinly rustypuberulous, spreading rachis; flowers spirally disposed, bracts and bracteoles not seen, pedicels thinly rusty, 2 in., buds oblong, thinly rusty, Calyx-tube short, lobes 4, thick, 2 in. long, very faintly imbricated; spineless externally. Petal 1. Staminal-sheath and filaments hairy. Pod broadly oblong, subequally rounded at base so that the strong slightly recurved beak, 3 in. long, continues the direction of the stalk, tip subobliquely cuneate, tapering abruptly on the dorsal, slightly rounded on the ventral suture, 3 in. long, 2.25 in. across; valves dehiscent, glabrous, woody, unarmed. Seeds 2-3, funicle thick arillate. Afzelia? coriacea Bak. in Flor. Brit. Ind. II, 275. Intsia coriacea Maingay MSS. Galedupa coriacea Prain MSS.

Manacca; Chaban, Maingay 566! Ridley 2328! PENANG; Tulloh Bahang, Curtis 430!

This fine tree is said by Mr. Ridley to be the "Sapetir" of Malacca; this name, it will be neticed, is used in Pangkor for the nearly allied but quite distinct S. intermedia. Mr. Curtis says it is known in Penang as "Mirbau;" the "Mirbau" of the Mainland, it will be observed, is Afzelia palembanica.

Of the specimens referred to the writer has only seen leaves of Maingay's, and only fruits of Curtis' and of Ridley's gatherings. The description of the flowers is therefore constructed from the characters stated and implied in the brief description of the Flora of British India. The number of stamens mentioned by Maingay, still more their monadelphous nature, makes it certain that the plant can be no Afzelia and goes to indicate that it is a species of Sindora; the fruiting specimens sent by Mr. Cartis and Mr. Ridley show that this is really the case.

The leaflets of this species are exactly like those of S. sumatrana but the pods differ in being much larger, and in being neither transversely twisted nor armed. The pods both in shape and in the absence of spines resemble those of S. Galedupa (Galedupa indica Lamk. Encyc. Meth. II, 594, as to syn. Caju Galedupa Rumph. Herb. Amboin. II, 59, t. 13) and only differ in being a good deal larger. The two may indeed ultimately prove to be forms of one species.

#### 51. AFZELIA Smith.

Erect unarmed trees. Leaves abruptly pinnate, with few pairs of opposite leaflets. Flowers in copious terminal panicles. Calyx with the disc produced to the top of the elongated tube; sepals 4, much imbricated, slightly unequal. Petal only one developed, orbicular with a distinct claw, the others absent or rudimentary. Stamens 3 perfect, filaments long, pilose; anthers minute, oblong, opening longitudinally. Pod large oblong flattish, sublignose, subindehiscent. Seeds exalbuminous. Species 10-12; tropics of Old World.

Leaflets 4, rarely 2:-

Pedicels and calyx glabrous ... ... ... 1. A. retusa.

Pedicels and calyx puberulous ... ... 2. A. bijuga.

Leaflets 8, rarely 10 or 6; (pedicels and calyx pubescent) ... 3. A. palembanica.

1. AFZELIA RETUSA Kurz, Journ. As. Soc. Beng. XLIII, 2, 73. A small tree 15-20 feet high, stem 6-8 in. in diam. Leaves even-pinnate, 3-6 in. long; leaflets 2- (very rarely only 1-) paired, sometimes only subopposite. subcoriaceous, glabrous on both surfaces, oblong, base rounded, apex obtuse, emarginate or retuse, 2-4 in. long, 1.5-2 in. wide, nerves numerous fine spreading reticulate, petiolules distinct, '15 in. long, glabrous as is the rachis. Flowers in numerous terminal simple rarely slightly branched few-flowered glabrous racemes 2.5-3 in. long; pedicels stout glabrous, '5 in. long, bracteoles ovate-oblong, glabrous, '2 in. long, very early caducous as are the similar bracts. Calux quite glabrous, tube slightly dilated upwards, '5 in. long, somewhat exceeding limb with 4 subequal oblong spreading lobes 35 in. long, 25 in. wide. Petal '7 in. long, limb '6 in. wide, '4 in. deep with rounded waved apex and wide-cuneate entire base, white or pinkish, claw very slender 3 in. long; pubescent along claw and midrib externally. Stamens 3 fertile, filaments 1.25 in., sparsely pubescent, pink. Ovary stalked, pubescent on lower suture, soon glabrous, style glabrous slender, 1.5 in. long. Pod 5-6 in. long, 2 in. wide, oblong, rigid, curved, coriaceous. Seeds orbicular, 1 in. in diam., '25 in. thick. Bak. in Flor. Brit, Ind. II, 274.

Andamans; very common on all the coasts. Perak; Wray 2491! Pangkore; Scortechini 975! Malacca; Griffith 1855! Singapore; Ridley 4675! 6006! Distrib. Gaugetic Delta.

Very nearly related to  $A.\ bijuga$  and perhaps only a variety of that species.

Mr. Baker attributes to this, just as Mr. Kurz does to A. bijuga, the occasional presence of 3 pairs of leaflets; none of the numerous specimens at Calcutta have more than two pairs of leaflets.

2. AFZELIA BIJUGA A. Gray, Bot. Amer. Explor. Exped. 467, t. 51. An erect tree reaching 50 feet in height, 1-1.5 feet in diam. Leaves evenpinnate, 3-6 in. long; leaflets 2-(very rarely only 1-) paired sometimes only subopposite, subcoriaceous, glabrous on both surfaces, oblong, base slightly oblique wide-cuneate or rounded, apex obtuse or bluntish acuminate emarginate, 2-4 in. long, 1.5-2 in. wide, nerves numerous fine spreading reticulate, petiolales distinct 15 in. long, glabrous as is the Flowers in leaf-opposed or terminal corymbose pubescent panicles 6 in. long, 4 in. wide, the individual racemes 1.5-2 in. long; pedicels slender puberulous 6 in. long, jointed, 2-bracteolate under the calvx, bracteoles oblong puberulous 'l in. long, bracts oblong 'l in, long caducous. Calyx puberulous, tube cylindric '3 in. long, rather shorter than limb with 4 subequal oblong spreading lobes 35 in. long, 25 in. wide. Petal 6 in. long, limb 5 in. wide, 35 in. deep, with rounded waved anex and wide cuneate entire base, white or pink, claw very slender, '25 in. long; pubescent along claw and midrib externally. Stamens'3 fertile, filaments 1.25 in., sparsely pubescent, pink. Ovary stalked, pubescent on both sutures, exserted, style glabrous slender, 1.5 in. long. Pod 6-8 in. long, 2.5 in. wide, oblong, rigid, thickly coriaceous. Seeds orbicular 1 in. across, 25 in. thick. Bak. in Flor. Brit. Ind. II, 274. Intsia amboinensis Thouars Gen. Nov. Madag. 22; DC. Prodr. II, 509; Mig. Flor. Ind. Bat. I, 80, all in part: Miq. Flor. Ind. Bat. Suppl. 288. Baryxylum rufum Lour. Fl. Coch. Chin. 266 in part. Macrolobium bijugum Colebr. in Trans. Linn. Soc. XII, 359, t. 17. Outea bijuga DC. Prodr. II, 511; Wall. Cat. 5823. Metrosideros amboinensis Rumph. Herb. Amboin. III, 21 (in part) t. 10. Jonesia triandra Roxh. Flor. Ind. II, 220.

ANDAMANS; very common in all the coast forests, Kurz! Prain! King's Collectors! NICOBARS; Kamorta, Kurz! SINGAPORE; Wallich (Cat. n. 5823 B)! Ridley! DISTRIB. All coasts from Eastern Polynesia to the Mascarene Islands.

In Mr. Kurz's description of this species occurs the statement that the leaflets may be at times in 3 pairs, and the same variation is indicated in Rumphins' figure quoted above. But the writer finds, as Mr. Baker does, that this species has not more than 4 leaflets. Mr. Kurz's statement is due to his having treated Andamans specimens of Afzelia palembanica as representing a form of A. bijuga.

The synonym Intsia amboinensis only applies to this species in the sense in which it is used by Miquel in his Suppl.: there is an authentic example of the Sumatra plant so named by Miquel in the Calcutta Herbarium; it is a specimen of Afzelia bijuga. The earlier use of the name must be neglected, since it has been made to cover Rumphius' description. For, while it is clear that that des-

cription includes this sea-coast species, it also includes one, if not more than one; inland species of far greater dimensions than this littoral tree ever attains.

Roxburgh's Jonesia triandra is not a Saraca but is this species.

3. AFZELIA PALEMBANICA Bak. in Flor. Brit. Ind. II, 275. A tall erect tree 100-150 feet high, stem 2-3 feet in diam. Leaves even-pinuate 6-8 in. long; leaflets usually 4- (very rarely only 3-, more often 5-) paired, sometimes only subopposite, subcoriaceous, glabrous on both surfaces, oblong, base slightly oblique, rounded or subcordate, apex obtuse or bluntish-acuminate emarginate, 2-4 in. long, 1.5-2 in. wide, nerves numerous fine spreading reticulate, petiolules distinct '15 in. long, glabrous as is the rachis. Flowers in leaf-opposed or terminal corymbose pubescent panicles of few-flowered racemes, 3.5 in. long, 2.5 in. across, the individual racemes 1 in. long; pedicels slender, pubescent, 15-2 in. long, jointed 2-bracteolate under the calyx, bracteoles ovate, pubescent, ·2 in. long, bracts small ovate, ·15 in. long, caducous. Calya downy, tube cylindric '2 in. long, shorter than limb with 4 subequal oblong spreading lobes 25 in. long, 2 in. wide. Petal 35 in. long, limb oblong 25 in. long, 2 in. wide, margin uniform, claw 1 in. long, glabrous. Stamens 3 fertile, filaments. '75 in., sparsely pubescent, dark-claret coloured, two sterile filaments at base of petal. Ovary stalked, pubescent, exserted; style glabrous, slender, '75 in, long. Pod 10-12 in. long, 3.5 in. wide, oblong, almost woody. Seeds wide-oblong, 1.25 in. long, 1 in. wide, 3 in. thick. A. bijuga Kurz, For. Flor. Brit. Burm. I, 412 not of Gray.

Andamans; South Point, Kurz! Perak; Wray! Kunstler 4433! 7387! Scortechini 1839! Malacca; Griffith! Maingay 565! Cantley 1670! Holmberg 776! Distrib. Siam (Teysmann!).

This is, according to Maingay, "the best Malacea timber tree;" according to Scortechini it affords "the best timber in the Peninsula." The Malay name, according to Scortechini, is *Mirbau* in Perak; Holmberg gives this as the Malacea name also. In Penang however, according to Curtis, the name *Mirbau* is used for Sindara coriacea.

While this species is Afzelia palembanica Bak., it certainly is not Intsia palembanica Miq., of which one of the original types is in Herb. Calentia. That tree, as Miquel says, has ovate-lanceolate leaflets (3 in. long by 1.25 in. wide, tapering to an acute point), it has also large ovate persistent bracts, 3 in. across. It does not seem necessary to alter the name in this place, but in a monograph of Afzelia it will be necessary to term the Peninsular species Afzelia Bakeri.

Mr. Baker has pointed out incidentally an omission in Mr. Kurz's Forest Flora of Brit. Burma: Kurz himself collected this species in the Andamans; strangely no one has met with it there again. He has, however, united it with A. bijuga and it is this union that explains Mr. Kurz's double error of attributing to A bijuga pods a foot long and leaves with more than 4 leaflets.

### 52. SARACA Linn.

Erect trees. Leaves abruptly pinnate, leaflets glabrous rigid subcoriaceous or coriaceous, in bud minutely stipellate, stipels very rarely persistent, stipules large intrapetiolar scarious completely united, rarely foliaceous partially free. Flowers in dense sessile paniculate rarely simple corymbs on old nodes, or rarely axillary, with subpetaloid coloured persistent or rarely decidous bracts and bracteoles. Calyx petaloid, limb 4-cleft lobes imbricate subequal, tube cylindric crowned by a lobed disc. Corolla 0. Stamens 2-8, exserted, with long filiform filaments and oblong versatile anthers opening longitudinally. Ovary many-ovuled, with a stalk attached to and produced beyond the disc, in most of the flowers rudimentary; style long filiform, stigma minute suboblique capitate. Pod flat dehiscent, rigidly coriaceous. Seeds exalbuminous. Species 16 or more; all South-Eastern Asiatic.

Leaves quite glabrous; stipules small at length scarious quite united along their inner margins; stipels vanishing; flowers yellow, at length becoming reddish, in paniculate corymbs:—

Bracts and bracteoles very deciduous, large where known; (pedicels glabrous):—

Leaflets 7-jugate, petiolules 4 in. long; calyx-lobes shorter than tube, bracts and bracteoles very large:—

Corymbs subsessile, dense, subsimple; pods over 3 in. broad; (calyx-lobes more than half as long as tube; stamens 4) ... ...

Corymbs in lax long-peduncled panicles; pods 2 in. broad:-

Calyx-lobes one-third as long as tube; stamens 4; pod beakless ... ... ...

Calyx-lobes half as long as tube; stamens 7-8; pod beaked ... ... ...

Bracts and bractcoles persistent, small; (petiolules not exceeding 2 in.):—

Stamens 7-8; (pedicels glabrous):-

Leaflets 1-2-jugate, coriaceous; bracteoles amplexican, ascending ... ... ... Leaflets 1-2-jugate, subcoriaceous; bracteoles not

amplexicant, spreading ... Stameus 3-4:-

Pedicels glabrous; ovary glabrous (leaflets 4-7-

Pedicels puberalous; evary pubescent:— Leaflets 4-7-jugate, corymbs short ... 7. S. macrop

5. S. indica.

... 6. S. bijuga.

... 8. S. palembanica.

1. S. thaipingensis. .

2. S. declinata.

3. S. cauliflora.

4. S. Kunstleri.

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Leaflets 2-4-jugate, corymbs long ... 9. S. triandra.

Leaves with rachis, petiolules and nerves beneath pubescent; stipules large foliaceous, united only in lower third; stipels persistent, flowers white in simple corymbs; (stamens 2) ... 10. S. latistiquiata.

SARACA THAIPINGENSIS Cantley MSS. in Herb. Kew. 50-80 feet high, with rather slender stem 6-15 in. in diam. Leaves with rachis 16-30 in. long; leaflets membranous, strongly veined, 6-8paired, oblong-lanceolate, apex acuminate, base slightly obliquely widecuneate, 12-16 in. long, 4-5 in. wide, secondary nerves about 12 pairs, dark-green, dull and glabrous on both surfaces; petiolules stout 4 in. long, stipels caducous; stipules coriaceous at length scarious, usually soon deciduous, the two united throughout into a convolute sheath for the subsequent bud, when laid open narrowly oblong, 1 in. long, 4 in. across, parallel-nerved and emarginate at the apex. Flowers in dense simple corymbs from old nodes on thick branches and stems, 3 in. long and 3-4 in. across; peduncles and pedicels glabrous, stout; bracts large oblanceolate obtuse, lowest 1.5 in. long, 3 in. wide, tapering from near the apex to the narrow-cuneate base, decreasing upwards; bracteoles 2 oblanceolate, deciduous, 5 in. long, pedicels below bracteoles 3 in. long. Calyx yellow at length becoming red, tube 8 in. long, less than twice as long as limb of 4 oblong sepals, 5 in. long. Petals 0. Stamens 4 with a rudimentary filament, the filaments slender throughout; anthers nearly twice as long as broad; filaments twice as long as sepals. Ovary stalked, puberulous along sutures, elsewhere glabrous, usually rudimentary; style declinate. Pod purple when young, shining dark-red when ripe, 15-18 in. long, 3.25 in. wide, linear-oblong, considerably curved, much compressed, stipe under 25 in. long, apex beakless, straight on lower, rounded on upper suture at the blunt apex, more rounded on upper than on lower suture at the oblique base.

Perak; Thaiping, Cantley 36! Tupai, Wray 2448! Larut, Scortechini! Kunstler 2249! 2768! Goping, Kunstler 4248! 6088! Malacca; Ulu Chembong, Derry 999! Bukit Tampin, Goodenough 1875 A!

Mr. Derry gives the local name of this as "Talan;" Mr. Goodenough notes it as "Gapis:" consult also the note under S. cauliflora.

2. Saraca declinata Miq. Flor. Ind. Bat. I, 84. A tree 20-60 feet high with rather stender stem 6-15 in. in diam. Leaves with rachis 12-24 in. long; leaflets thinly subcoriaceous, strongly veined, 6-8-paired, oblong-lanceolate, apex acuminate, base slightly obliquely wide-cuneate, 9-12 in. long, 3-4 in. wide, secondary nerves about 12 pairs, dark-green shining above, dull beneath, glabrous on both surfaces; petiolales thick '4 in. long, stipels caducous; stipules coriaceous at length scarious, usually soon deciduous, the two united throughout into a convolute sheath for the subsequent bud, when laid open '75 in. long, '3 in. wide,

parallel-nerved. Flowers in panicles of corymbs from leaf axils and from old nodes on branches and stems, 1 foot long, sometimes nearly as broad, individual corymbs 4-6 in. long, peduncles and pedicels glabrous. stout, bracts very large ovate-acuminate, 2 in. long, 7 in. wide, tapering from the middle to both ends, decreasing upwards: bracteoles 2, elliptic. decidnous, 5 in. long, pedicels below bracteoles 5 in. long. bright yellow, tube 1 in. long, cylindric, slender, slightly curved, thrice as long as limb of 4 obovate obtuse-sepals. Petals 0. Stamens 4 with a rudimentary filament, the filaments slender throughout and inserted in the retiring angles of a 5-lobed disc; anthers nearly twice as long as broad: filaments thrice as long as sepals. Ovary stalked, puberulous along sutures elsewhere glabrous, most often rudimentary; style declinate. Pod black, 12 in. long, 2.75 in. wide, linear-oblong, quite straight, compressed, stipe under '25 in. long, base equally cuneate and apex equally acute to the beakless tip. Jonesia declinata Jack, Malay. Miscell. II, 7, 74; Walp. Rep. I, 844.

Pahang; Tembeling, Ridley 2587! Perak; Kwala Kearing, Wray 544! Scortechini 1747! Larut, Kunstler 2729! 3961! 5393! Selangor; Kwala Lampar, Curtis! Malacca; Nyalas, Goodenough 1720! DISTRIB.; Sumatra, Java.

This species is said by Mr. Goodenough to be "Gapis Kognet" or "Talan Kognet," the same names as he cites for S. cauliflora; see note under that species.

3. SARACA CAULIFLORA Bak. in Flor. Brit. Ind. II, 272. A tree 20-60 feet high, with rather slender stem 6-15 in. in diam. Leaves with rachis 12-16 in. long; leaflets rigidly subcorraceous, strongly veined, 5-6paired, oblong-lanceolate, apex acuminate, base slightly obliquely widecuneate, 9-12 in. long, 3-4 in. wide, secondary nerves about 12 pairs, dark-green shining above, dull beneath, glabrous on both surfaces: petiolules stout 4 in. long, stipels caducous; stipules coriaceous at length scarious usually soon deciduous, the two united throughout into a convolute sheath for the subsequent bud, when laid open '75 in. long; '3 in. wide, parallel-nerved. Flowers in panicles of corymbs from old nodes on branches and stems, 6 in. long and as much across, individual corymbs 3 in. long, peduncles and pedicels glabrous stout; bracts very large, obovate-acute, deciduous, lowest 2 in. long, 6 in. wide, tapering from above the middle to a cuneate base, decreasing upwards; bracteoles 2, lanceolate, deciduous, 5 in. long, pedicels below bracteoles 5 in. long. Calyx yellow, tube 1 in. long, twice as long as limb of 4 oblong sepals. Petals 0. Stamens 7-8 with a rudimentary filament and two acute angular projections on the disc; the filaments alternately slender throughout and widened towards the base; anthers nearly twice as long as broad; filaments twice as long as sepals. Ovary stalked, puberulous

along sutures elsewhere glabrous, usually rudimentary; style declinate. Pod black, 12-15 in. long, 2.25 in. wide, linear-oblong, somewhat curved, compressed, stipe '3 in. long, base cuneate towards upper suture, apex acute tapering towards lower suture which is prolonged into a stout beak 1 in. long.

Malacca; Griffith, Maingay, Derry! Goodenough! Perak; Scortechini!

The local name of this species is said by Mr. Goodenough to be "Gapis Kognet" or "Talan Kognet;" Mr. Derry notes it as "Bunga Talan?"

How far the characters are valid that separate this species and S. thaipingensis from S. declinata is, in the writer's opinion, a very doubtful matter. The chief diagnostic character, in the case of S. cauliflora, is the presence of 7 stamens and the writer has accordingly placed in Mr. Baker's species only those specimens where 7 or 8 stamens occur. These however consist of but two gatherings, one from Malacca and one from Perak; for, as it happens, neither Maingay's nor Griffith's specimens that form the original types of the species are represented at Calcutta. The pods described were collected by Goodenough in Malaeca and are placed here because they certainly differ from the pods that are known to belong to the tree described as S. declinata and from those that belong to S. thaipingensis. But young pods of S. declinata from Java are rather more like those here supposed to belong to S. caulifora than like those of the Peninsular S. declinata and a careful field study of the forms by Malayan botanists is urgently called for. The species which Mr. Cantley has named S. thaipingensis has usually been distributed as S. cauliflora and it is, as a matter of fact, of the three here described, the one that best accords with Mr. Baker's account of the leaves and of the corymbs of his S. cauliflora. But S. thaipin. gensis appears never to have more than 4 stamens and therefore can hardly be Baker's plant. If it can only be shown that the characters to be derived from the stamens and the pods are at all variable it may be possible to reduce both Mr. Baker's and Mr. Cantley's plants to S. declinata.

SARACA KUNSTLERI Prain. A tree 20-40 feet high, stem 3-5 in in diam., branchlets zigzag glabrous. Leaves even-pinnate, rachis 5-10 in. long, glabrous; leaflets petiolulate large, 2-3-jugate, diminishing downwards, ovate-acuminate, base cuneate, distal 8-10 in. long, 3:5-4 in. wide, basal if 2 pairs and central if 3 pairs 4-5 in. long, 2.25-2.5 in. wide, basal if 3 pairs 3.5-4 in. long, 2-2.25 in. wide; all chartaceous, dark-green above, rather paler beneath, glabrous on both surfaces, main-nerves ascending, 6-9 pairs, more prominent beneath as is the midrib and the fine secondary reticulation; petiolules 25 in. long. Flowers in terminal long-peduncled paniculate corymbs, the peduncles 8-12 in. long, glabrous as are the branches 1-2 in. long, and the pedicels. Calyx-tube and pedicels, especially the latter, very short, together only 4-5 in. long; bracts not seen; catyx-lobes ovate-oblong 2 in. long, glabrous. Corolla O. Filaments 7, anthers not seen. Pod falcate 4-6 in. long, 1.5 in, wide, glabrous. Seeds 5-6, transversely ovate, 5 in. long, 7 in. across, 25 in. thick, testa black, smooth, shining, crustaceous. PERAK; Gunong Batu Pateh, 1500-2000 feet, Kunstler 8048!

A very distinct species, apparently nearest S. Lobbiana Bak.; unfortunately good flowers are not yet available for description.

5. SARACA INDICA Linn. Mant. I, 98. A low wide-spreading tree 20-30 feet high, stem 2 feet thick, branches glabrous. Leaves with rachis 7-8 in. long, rachis glabrous, leaflets subcoriaceous 5, less often 6 rarely 4 pairs, oblong-lanceolate apex obtuse or acute, base rounded or cuneate slightly oblique, 6-9 in. long, 2-3 in. wide, margins faintly undulate, dark-green shining above, dull and paler beneath, both sides quite glabrous; petiolules short '2 in. long very stout, stipels deciduous; stipules small at first coriaceous, green, at length scarious, brown, the two united completely from base to apex into a convolute sheath for the subsequent bud, when laid open ovate-oblong '4 in. long, '25 in. wide, parallel-nerved and minutely laciniate at the wide tip. Flowers in dense corymbs 3-4 in. in diam., axillary; peduncles and pedicels reddish, glabrous, rather stout, basal bracts ovate-subacute with ciliolate margins, bracteoles 2 subopposed persistent ascending oblong-spathulate subacute amplexicaul, 15 in. long, pedicels below bracteoles 3-5 in. long. Calyx bright-orange becoming at length red, tube 5-6 in. long, cylindric, about twice as long as limb of 4 obovate-oblong sepals. Petals 0. Stamens 7 or 8 with 2 rudimentary filaments, all filaments slightly widened and slightly connate at base, reddish, anthers nearly twice as long as broad, purple; filaments thrice as long as sepals, Ovary stalked, puberulous along the sutures elsewhere glabrous, 8-12-ovuled, in most flowers rudimentary and then quite glabrous; style filiform declinate nearly as long as filaments. Pod black, 4-10 in. long, 1.7 in. wide, linear-oblong, compressed, valves strongly wide-reticulate; stipe 25 in. long. Seeds 4-8, oblong, compressed, 1.5 in. long. Miq. Flor. Ind. Bat. I, 83; Bedd. Fl. Sylv. t. 57; Bak. in Flor. Brit. Ind. II, 271. S. arborescens Burm. Fl. Ind. 85, t. 25, f. 2. Jonesia Asoca Roxb. As. Res. IV, 355; Fl. Ind. II, 218; DC. Prodr. II, 487; Wall. Cat. 5822; W. & A. Prodr. 284; Wight Ic. t. 206; Bot. Mag. t. 3018. J. pinnata Willd. Sp. Pl. II, 287.

MALACCA; fide Baker in Flora of Brit. India. Probably planted; the species has never been sent to Calcutta by any Malayan botanist.

6. Saraca bijuga Prain. A tree with spreading branches 20-30 feet high, stem 6 in to 2 feet thick; branches glabrous. Leaves with rachis 1 in long, leaflets thinly subcoriaceous 2-, or not infrequently 1-jugate, oblong-lanceolate, apex gradually narrowed in the upper third to a sharp point, bases of terminal pair very oblique, rounded on lower cuneate on upper margin, of lower pair rounded or subcordate on both sides, 4-10 in long, 1-2.75 in wide, margins faintly undulate, dark-green

and shining above, dull and paler beneath, both sides quite glabrous; petiolules very short under 1 in., stout, stipels deciduous; stipules small coriaceous at length scarious, completely united from base to apex, narrowly ovate-oblong '6 in. long, 2 in. wide, tip subacute. Flowers. in dense corymbs 4-5 in. in diam., axillary, peduncles and pedicels reddish, glabrous, slender, basal bracts ovate-subacute with ciliolate . margins, bracteoles 2 subopposed persistent spreading, ovate-obtuse not amplexicaul, 15 in. long, pedicels below bracteoles 15-2 in. long. Calux orange becoming at length light-red, tube 25 in. long, cylindric, hardly longer than the limb of 4 ovate-obtuse sepals. Petals 0. Stamens 7 or 8, all filaments slightly widened and faintly connate at base, dark claret-coloured; anthers not much longer than broad; filaments thrice as long as sepals. Orary stalked, very sparsely puberulous along sutures, in most flowers rudimentary and then quite glabrous. Pod reddishyellow, smooth, polished, faintly reticulate, 6-8 in. long, 2:35 in. across; stipe 2 in. long. Seeds 4-6.

Perak; Larut; in open jungle generally near munning streams, Kunstler 2749! 2382! 4059! Kinta, near limestone hills, Kunstler 7221! Larut, Scortechini 1503! Batu Togoh, Wray 2152!

This is the nearest of the native Malayan species to the common Indian Saraca indica; it is however very distinct on account of its 2-jugate leaves, its smaller flowers with spreading bracteoles and its very different pods. Elsewhere the writer has indicated the possibility of this proving ultimately to be only a variety of the not very fully described Javanese S. minor Miq. But from Miquel's account of that plant this must be at least an exceedingly distinct variety.

SARACA MACROPTERA Mig. Flor. Ind. Bat. I, 1080. A tree 30-40 feet high, stem 4-6 in. in diam. Leaves with rachis 4-15 in. long; leaflets rigidly subcoriaceous 4-7-paired, oblong-lanceolate, apex gradually narrowed to an acuminate tip, base slightly unequally rounded. 5-12 in. long, 1.5-3.5 in. wide, secondary nerves about 12 pairs, curving forward, prominent beneath, bright-green shining above, paler dull beneath; petiolules 15 in. long, glabrous as is the rachis, stipels caducous; stipules completely united in a scarious bud-sheath 5 in. long. Flowers in densely fascicled corymbs in leaf axils and on old nodes, 1 in. long, 1.5 in across; peduncles and pedicels quite glabrous very slender, the latter 25-3 in. long below the two ovate-oblong spreading persistent bracteoles 15 in. long; bracts ovate-acute 1 in. long. Calya brightyellow, tube slender cylindric 25 in. long, exceeding the limb of 4 oblong sepals 2 in. long. Petals 0. Stamens 3-4, twice as long as sepals. filaments slender and inserted on the crenately lobed disc; anthers short oblong. Ovary stalked glabrous. Pod not seen.

PERAK; Larut, in low wet ground, Kunstler 5511! DISTRIB. Sumatra, Borneo.

This is extremely closely related to S. palembanica but is readily distinguished by its glabrous pedancles and pedicels, and its glabrous ovary. The solitary Perak gathering differs from the original Sumatrana specimens (n. 863 Hort. Bogor) in having much smaller flowers, but is not otherwise distinguishable. It may, on the whole, be better, however, to treat the Peninsular plant as a distinct variety, VAR parviflora; unless it should be found that the two differ markedly in fruit they can hardly be looked upon as distinct species: as yet, the fruit is unknown in either plant.

Saraga Palembanica Miq. ex Bak. in Flor. Brit. Ind. II. 272 A tree with spreading branches, 30-40 feet high, stem 8-10 in. in diam. Leaves with rachis 8 in. long; leaflets rigidly subcoriaceous 4-7 paired, oblong, apex obtuse shortly abruptly acuminate, base slightly unequally rounded, 5-14 in. long, 2.5-4.5 in. wide, secondary nerves about 12 pairs, curving forward, prominent beneath, dark-green above, paler beneath, rather dull; petiolules 15 in. long, glabrous as is the rachis, stipels caducous; stipules completely united in a scarious bud-sheath 5 in. long. Flowers in densely fascicled corymbs on old nodes, 2 in. long nearly as much across; peduncles and pedicels pubescent, slender, the latter 5 in. long below the two ovate-oblong spreading persistent bracteoles 2 in. long; bracts ovate-subacute 2 in. long. Calyx orangeyellow, tube slender cylindric 35 in. long, exceeding the limb of 4 oblong sepals 25 in. long. Petals 0. Stamens 4, at times only 3, two and a half times as long as sepals, filaments slender and inserted in the retiring angles of a crenately lobed fleshy ring, deep-purple as are the shortly oblong anthers. Ovary stalked, densely hairy, in most flowers rudimentary and then subglabrous. Pod not seen. Jonesia (Saraca) palembanica Miq. Flor. Ind. Bat. Suppl. 291.

PENANG; Kulang Ulu, Curtis 647! PANGEORE; Dindings river, Curtis 1386! MALACCA; Maingay! DINDINGS TERRITORY; "in wet low lands," Bryant! Perak; Larut, "in low wet ground," Kunstler 6372! Scortechini 138! DISTRIB. Sumatra.

This is very near S. macroptera Miq. but differs in having rather smaller flowers, with pubescent peduncles and pedicels, and more densely clustered corymbs. Miquel describes the ovary as glabrous, but it is densely pubescent except in the case of the abortive ovaries which occur, however, in the vast majority of the flowers. Though its leaves very much resemble those of S. macroptera, it is less closely allied to that species than it is to S. triandra, a species which is much more common in the Malay Peninsula than either of the others.

SARACA TRIANDRA Bak. in Flor. Brit. Ind. II, 272. A slender tree 15-30 feet high, stem 4-8 in. in diam. Leaves with rachis 15-3 in. long; leaflets thinly subcoriaceous, 2-3-, very rarely 4-paired, oblanceolate-oblong, obtuse with or without an abrupt acumen, or subacute, tapering from beyond the middle to a cuneate base, lower pair very rarely rounded at base, and narrowed towards apex; 5-12 in. long, 2-6 in wide, secondary nerves about 12 pairs, the lowest pair distinctly

marginal to half-way up, the others curving forward prominent beneath; dark-green shining above, dull beneath, glabrous on both surfaces; petiolules '15 in. long, glabrous as is the rachis, stipels caducous; stipules completely united in a scarious bud-sheath 5 in. long. Flowers in lax fascicled corymbs in leaf-axils and on old nodes, 5-8 in long and broad; peduncles and pedicels slender pubescent, the latter '75 in. long below the two ovate-oblong spreading persistent bracteoles 25 in long; bracts ovate subacute 2 in. long. Calyx yellow becoming pink or red, tube slender cylindric, 25 in, long, about as long as limb of 4 oblong sepals. Petals O. Stamens 3-4, two and a half to three times as long as sepals, filaments slender, inserted on a crenated fleshy ring, purplish as are the anthers. Ovary long-stalked, densely pubescent, mostly rudimentary. Pod oblong, very obliquely rounded at base on lower suture, obliquely obtuse at apex with lower suture projecting as a beak 25 in. long; 4-6 in. long, 1:5-1:75 in. wide, much compressed, valves brown when ripe, uniformly finely puberulous. Seeds 3-4.

MALACCA; Griffith! Miller! Hervey! Goodenough 1463! 1478! Maingay 563! Perak; in dry rocky places, Kunstler 2138! 2757! 3484! 3797! 3886! 3912! 3987! 4507! 4517! 5563! 7912! 8516! 8561! Ridley 3026! 3099! Wray 41! Scortechini 1143! 1675! Penang; Government Hill, Curtis 165! Dindings; at Rajah Hitam, Bryant! Distrib.; Sumatra, (Moera Enim; Teysmann 3638!)

Mr. Goodenough gives the native name of this as "Talan." The species is remarkably closely related to S. palembanica and differs only by its larger laxer corymbs and its fewer leaflets, and further investigation on the part of field-botanists in Malaya may demonstrate that Mr. Baker's species is only a form assumed in dry localities by the tree that was previously described by Miquel as Jonesia palembanica. Both the synomyms of the Flora of British India should be deleted, for Jonesia triandra Roxb. is Afzelia bijuga, while J. scandens Roxb. is, by Roxburgh's definition, clearly not this species and probably not a Saraca at all.

10. Saraca latistipulata Prain. A small tree with slender leafy pubescent branches. Leaves 8 in. long, rachis puberulous, leaflets rigidly coriaceous, 6 pairs, ovate-lanceolate, apex acuminate, base slightly obliquely rounded, 4.5-6 in. long, 1.5 in. across, dark-green, dull glabrous above, pubescent on the midrib beneath and puberulous along the margins, petiolules short, 15 in. long, pubescent, stipels small subulate persistent pubescent; stipules large foliaceous each with a strong midrib, ovate-acute, auriculate at base on their outer free margin, connate between petiole and brauch for one-third their length on the inner margin, from 5-1.5 in. long, 25-1 in. wide, usually slightly unequal. Flowers in very few-flowered cymes, sometimes reduced to single pedicels, clustered on rugose woody nodes along thick old branches, under 75 in. long; with ovate-lanceolate persistent basal bracts and two sub-

opposite amplexicanl triangular persistent erect bracteoles midway between bract and calyx-tube, pedicels and bracteoles puberulous. Calyx white, tube cylindric '15 in. long, shorter than limb of 4 narrowoblong sepals, pubescent along margin at tip. Petals 0. Stamens 2 with a rudimentary filament between them, opposite to and involved by the inmost calyx segment; filaments widened at base and subconnate, pink; anthers nearly twice as long as broad, filaments twice as long as sepals. Ovary pubescent. Pod oblong, obliquely obtuse at apex with a rather pronounced beak, obliquely rounded at base, 2 in. long, 1 in. across.

PERAK; Dindings, Lumut, Ridley 3089! 8006!

A very remarkable species, easily distinguished from all those hitherto known by its large foliaceous stipules, and its stipellate leaves with pubescent rachis. It has been obtained twice, both times in the same locality, and on both occasions by Mr. Ridley.

#### CRUDIA Schreb. 53.

Shrubs or trees. Leaves odd-pinnate or spuriously even-pinnate by the approximation of the penultimate to the terminal leaflet, the leafrachis sometimes prolonged beyond the ultimate leaflet, the remaining leaflets usually conspicuously alternate rarely occasionally subopposed; stipules interpetiolar, stipels 0. Flowers in racemes either terminating, or simple or in clusters at the bases of, the glabrons or pubescent new leafy shoots. Calyx-tube very short, with a short disc, segments 4 oblong, imbricated, persistent, reflexed in flower. Petals 0. Stamens 10 (or 8-9) exserted, filaments free filiform, anthers oblong, versatile, dehiscing longitudinally. Ovary pubescent, few-ovuled; with distinct short glabrous stalk and filiform incurved glabrous style; stigma terminal capitate, small. Pod with 2 rigidly coriaceous subcompressed valves. Seeds few, often only 1, exalbuminous. Species, one each Indian and African; nine or ten American; about twelve Malayan.

The oldest names for this genus, according to the Index Kewensis, are Aplatoa Aubl. and Touchiroa Aubl. As the first name was based on the flowers of one species of this genus with the fruit of a Pterocarpus, it cannot possibly be used. There seems nothing against the employment of the second name which was given to a species of the group with few leaflets to the leaf-rachis — the group to which C. bantamensis, C. gracilis and C. Wrayi, among Malayan species, belong.

Leaflets more than 3 (§ Crudia) :-

Leaflets coriaceous, very long caudate-acuminate, rachis prolonged beyond the last of the oblanceolate, all conspicuously alternate leaflets; (innovations and petioles densely rusty-tomentose)

1. C. caudata. 218

Leaflets papery, acute or shortly acuminate, rachis not prolonged beyond the two terminal, often spuriously opposite leaflets:-Innovations and petioles pubescent, leaflets uniformly puberulous or pubescent beneath; racemes rather lax; petiolules and pedicels rather long :-Leaflets 11-13, lanceolate, pubescence tawny, pod densely rusty-pubescent C. Scortechinii. Leaflets 7-9, obovate to oblong, pubescence grey, pod tawny-puberulous... 3. C. Curtisii. Leaflets puberulous beneath; apex shortly acuminate ... ... VAR. typica;

Leaflets densely pubescent beneath; apex acute ... ... VAR.? Wallichii.]
Innovations and petioles glabrous; racemes rather dense; petiolules and pedicels rather short:—
Leaflets 7-8, glaucous, glabrous on the nerves, else-

where uniformly puberulous beneath ... ... Leaflets 5 (rarely 3), pale-green, quite glabrous beneath ... ... ...

C. glauca.
 C. speciosa.

Leaflets 3 or by abortion fewer (§ Touchirea):—

Leaflets small oblanceolate, racemes dense with puberulous rachis and pedicelled flowers ... ... 6. C. Wrayi.

Leaflets large ovate-oblong, racemes sparse with glabrous rachis and sessile flowers ... ... 7. C. gracilis.

1. CRUDIA CAUDATA Prain. A small tree with slender at length glabrescent branches, and densely rusty-tomentose new shoots. Leaves odd-pinnate, rachis 1.5-2 in. long, petiole articulate, the interpetiolar stipules united by their inner margins at the base only, elsewhere free, lanceolate, densely rusty-pubescent on their petiolar, glabrous on their axillary aspect; leaflets 5-7, petiolules 'l in long, densely rusty-tomentose as is the rachis, which is prolonged beyond the last leaflet into a subulate process; alternate, oblanceolate, base rounded in lower, deltoid in upper leaflets, apex prolonged into a .75 in. long, narrow-caudate tip, 2.5-4 in. long, 1 in. across, rigidly coriaceous, dark-green glabrous and shining above, dull and densely rusty-pubescent on the nerves beneath, lateral nerves 6-7 pairs slightly ascending, looped within the margin, secondary venation prominent beneath, all nerves obscure above. Flowers in narrow racemes at the bases of new leafy shoots, with round densely. rusty-tomentose rachis, pedicels rather stout, under '25 in. long, densely rusty with a subulate bracteole close under calyx; buds oblong 2 in. Calux-tube very short, lobes 4, imbricate, reflexed in flower, densely rusty outside, quite glabrous within. Stamens not seen. Ovary stipitate, densely rusty-velvety, 1-ovuled, stalk glabrous as long as calyx-tube. Pod (young) linear-oblong, obliquely rounded at base,

apex obtuse apiculate, compressed, 2 in. long, 75 in. across, valves densely, shortly, subscabridly rusty-pubescent. Seed 1. Touchiroa caudata Prain MSS.

JOHORE; Tanjong Kupang, Ridley 6399! DISTRIB. Borneo.

A remarkably distinct species, though recalling in some respects the description given by Hasskarl of *C. orientalis* (*Cat. Hort. Bog.* 288). Hasskarl's species has, however, more numerous leaflets which are only rusty-pubescent on their margins; it has also larger, 2-seeded pods.

2. CRUDIA SCORTECHINII Prain. A tree 80-90 feet high, young branches tawny-pubescent. Leaves odd-pinnate, rachis 6-8 in. long, petiole articulate on an auricled node with an interpetiolar entire stipule, leaflets 11-13, with petiolules 2 in. long, sparsely tawny-pubescent as is the rachis, alternate, lanceolate, base slightly unequally rounded, apex acuminate, 2-3 in. long, I in. wide, papery, green and glabrous above, paler and pubescent with short sparse tawny hairs beneath, lateral nerves spreading, 12-16 pairs, not much stronger than the fine secondary venation. Flowers in narrow racemes at the ends and bases of new leafy shoots, 3-6 in. long, with angular tawny-pubescent rachis; pedicels slender at length 4 in. long, tawny-puberulous, many of the lower caducous, minutely bracteolate about the middle; buds oblong 2 in long. Calyx-tube very short lined by a disc, lobes 4, imbricate in bud reflexed in flower, sparsely pubescent on both surfaces. Petals 0. Stamens 9, filaments glabrous, free, alternately short and long, anthers broadly ovate, versatile. Ovary stipitate, densely tawny-villous, 1- or 2-ovuled; stalk glabrous as long as calyx-tube, style glabrous incurved. Pod oblong, obliquely rounded at both ends, densely rusty-tomentose, rugulose, 2.5 in. long, 1.5 in. across, flat. Seed 1, funiculus elongated. Scortechinii Prain MSS.

PERAK; Goping, Scortechini 2129!

A very distinct species.

3. CRUDIA CURTISH Prain. A tall tree 80-150 feet high with spreading crown and densely grey-pubescent branchlets; stem 2-3 feet in diam. Leaves odd-pinnate, rachis 3-4 in. long, petiole articulate on an auricled node with an interpetiolar 2-lobed stipule, leaflets 7-9, with petiolales 25 in. long, closely puberulous as is the rachis, alternate, obovate to oblong, base slightly obliquely rounded or cuneate, apex rounded or tapering to an at length bluntly caudate tip, 2-3.5 in. long, 1-1.5 in. wide, membranous, green and glabrous above, paler and uniformly sparsely puberulous beneath, lateral nerves ascending prominently looped within margin, secondary venation indistinct. Flowers in rather lax narrow racemes at the ends and bases of new leafy shoots, 4-6 in. long, with angular densely grey-pubescent rachis; pedicels very

slender, at length 6 in long, grey-puberulous, with a caducous subulate bracteole about the middle; buds oblong 15 in long. Calyx-tube very short, lobes 4, imbricate, reflexed in flower, sparsely pubescent externally, glabrous within. Petals 0. Stamens 10, filaments glabrous, free, alternately long and short, anthers broadly oblong, versatile. Ovary stipitate densely grey-downy, 1- or 2-ovuled, stalk glabrous longer than calyx-tube, style glabrous incurved. Pod oblong, obliquely rounded at base, subequally rounded and apiculate at tip, rusty-puberulous, rather distinctly reticulate, 3 in. long, 2 in. wide, 5 in. thick, valves very firmly coriaceous. Seed 1, oblong, 1.25 in. long, 1.2 in. wide, 35 in. thick. Touchiroa Curtisii Prain MSS.

Penang; Govt. Hill, 1200 feet elev., Curtis 3007! Malacca; Bukit Sadanan, Derry 1164! Perak; Larut, Kunstler 7467! Thaiping, Kunstler 8514! Kinta, Kunstler 4753!

Var. ? Wallichii Prain; leaf-rachis and leaflets beneath densely softly velvety; leaflets acute, not cuspidate or caudate at the tip. Leguminosa Wall. Cat. 5983. Ignota Wall. Cat. 8089. Touchiroa Wallichii Prain MSS.

PENANG; Porter (Wall. Cat. 5983)! Wallich (Cat. 8089)!

This fine tree is, according to Mr. Derry, known in Malacca as 'Kumpas ruman.' Though very nearly related to C. glauca it seems to be quite distinct and is easily separated by its longer petiolules; pubescent leaf-rachis, rachis of inflorescence and young leafy shoots; also by its rather smaller leaflets and pods. It is likewise very closely related to C. speciosa but it has longer pedicels and a less dense inflorescence than that species, which moreover has the leaflets quite glabrous.

The plant here tentatively referred to the species as VAR. P. Wallichii occurs twice in the Wallichian Herbarium, on both occasions without flowers or fruits. It has never been obtained again and it is just possible that when it is re-discovered it will prove a distinct species, C. Wallichii.

4. CRUDIA GLAUCA Prain. A tree 50-70 feet high, with spreading glabrous branches; stem 1.5-2.5 feet in diam. Leaves odd- (or sometimes even-) pinnate, rachis 2-2.5 in. long, petiole articulate on an auricled node with an interpetiolar 2-lobed stipule, leaflets 7-8, with petiolules 15 in. long, quite glabrous as is the rachis, alternate or occasionally subopposite, oblanceolate-oblong, base slightly obliquely rounded, apex rounded and at length abruptly obtusely cuspidate, 2.5-4 in. long, 1.25-1.75 in. wide, thinly papery, dark-green and quite glabrous above, very glaucous glabrous on the nerves elsewhere finely adpressed-puberulous beneath, lateral nerves ascending, prominently looped one-third their length within the margin, secondary venation in distinct. Flowers in dense narrow racemes at the bases of new leafy shoots, 3-5 in. long, with angular glabrous rachis. Calya not seen. Pod oblong tapering subequally at base to a stipe 25 in. long, and at a pex to a

short acute beak, closely tawny-puberulous, rather distinctly reticulate, 4 in. long, 2 in. wide, 6 in. thick; valves very firmly coriaceous. Seed 1, oblong, 1.5 in. long, 1.2 in. across, 4 in. thick. Touchiroa glauca Prain MSS.

PERAK; Goping, Kunstler 8175!

This is very nearly related to *C. Curtisii* but differs markedly in having leaflets very glaucous beneath, the leaflets being also rather larger and the petiolules shorter; in having the leaf-rachis, petiolules, and nerves beneath glabrous; and in having, as is shown by the scars on the rachis of the infruitescence, much more densely flowered racemes; the pods also are larger than in *C. Curtisii*. Flowers have not yet been sent. Of all the Malayan species, this is the one that most nearly approaches the Ceylon *C. zeylanica*.

5. CRUDIA SPECIOSA Prain. A handsome tree with slender pendulous glabrous branches and glabrescent new shoots. pinnate, rachis 2-3 in. long, petiole articulate on an auriculate node, Leaves oddwith an interpetiolar 2-lobed stipule, leaflets 5 (rarely 3), with petiolules '15 in. long, glabrous as is the rachis; alternate, oblong, base unequally rounded or truncate, apex abruptly tapering to a short acutely candate tip, 2-2.5 in. long, 1-1.5 in. wide, papery, dark-green above, paler beneath, quite glabrous or both surfaces, lateral nerves spreading slender, looped within margin, hardly more prominent than secondary venation. Flowers in rather dense narrow racemes at the ends of new leafy shoots, 6-10 in. long with round glabrescent rachis; pedicels spreading, very slender, quite glabrous, 35 in. long, with a minute bracteole below the middle; buds oblong, 25 in. long. Calyx-tube very short, lobes 4, imbricate, reflexed in flower, very sparsely puberulous externally, glabrous within. Petals 0. Stamens 10, filaments glabrous, free, alternately short and long, anthers broadly oblong, versatile. Ovary stipitate, densely pubescent, 1- or 2-ovuled; stalk as long as calyx-tube, glabrous, style glabrous incurved. Pod not seen. Touchiroa speciosa Prain MSS.

Pungan; "a very handsome tree with dark-green leaves and slender pendulous branches; growing in the Rajah's Garden," Curtis 2955!

Nearest to C. Curtisii and C. glauca but evidently quite distinct from both.

6. CRUDIA WRAYI Prain. A small tree with slender glabrous branches. Leaves odd-pinnate, rachis 1 in. long, petiole articulate on an auriculate node, the interpetiolar lanceolate stipules united at their very base only, glabrous as are the leaf-rachis and the petiolules, '15 in. long; leaflets 3, alternate, oblanceolate, base cuneate, apex acute or rounded and shortly abruptly acuminate, 1.5-2.5 in. long, '5-1 in. wide, thinly papery, pale yellowish-green, glabrous on both surfaces, lateral nerves spreading, 7-8 pairs, slender, looped within margin, secondary nervation fine but distinct. Flowers in narrow dense racemes at the ends and

bases of new leafy shoots, 4-8 in. long, with angular puberulous rachis; pedicels slender 2 in. long, puberulous, bracteolate in the middle; buds oblong, 15 in. long. Calyx-tube very short, lobes 4, imbricate in bud, spreading in flower, faintly puberulous outside, glabrous within. Petals 0. Stamens 8-9, alternately long and short, anthers broadly ovate, versatile. Ovary shortly stipitate, densely pubescent, 1- or 2-ovuled; stalk glabrous equalling calyx-tube, style glabrous incurved. Pod unknown. Touchiroa Wrayi Prain MSS.

PERAK; Larut, at Sungei on the plains, Wray 2874!

This is a member of the group of species forming the original genus Touchiroa, to which C. bantamensis and C. gracilis, among Malayan species, also belong. But C. Wrayi is easily distinguished from both the species mentioned by its very small leaflets and its much longer pedicels; the flowers, except for having longer stalks, are extremely like those of C. bantamensis.

7. CRUDIA GRACILIS Prain. A slender shrub 6-8 feet high, young branches glabrous. Leaves odd-pinnate, rachis '75-1 in. long, petiole articulate on a small node, with interpetiolar glabrous lanceolate stipules united only at their very bases, leaflets 3 (or occasionally 2 from abortion of one lateral leaflet), with stout petiolules 25 in. long, glabrous as is the rachis; alternate, ovate-oblong to oblong-lanceolate, base cureate or slightly unequally rounded, apex shortly caudate-acuminate, 4.5-6 in. long, 2-3 in. across, firmly papery, pale vellowish-green. glabrous on both surfaces, lateral nerves ascending, about 6 pairs, distinct. secondary venation somewhat distinct beneath. Flowers in very narrow sparse spikes at the ends of new leafy shoots, 10-12 in. long with angular quite glabrous rachis; sessile, minutely bracteolate below the calyx; buds oblong, 15 in. long. Calyx-tube very short, lobes 4, imbricate in bud, spreading in flower, quite glabrous on both surfaces. Petals 0. Stamens 8-9, filaments glabrous, free, alternately short and long, anthers broadly ovate, versatile. Ovary shortly stipitate, densely pubescent, 1- or 2-ovuled; stalk glabrous, shorter than calvx-tube, style glabrous incurved. Pod unknown. Touchiroa gracilis Prain MSS.

Perak; Thaiping, in low wet ground in dense forest, rare, Kunstler 8468!

This is extremely closely related to *Touchiroa bantamensis* Hassk. which has also 3- (or by abortion 2-) foliolate leaves, but has larger leaflets, puberulous rachis and sepals, and distinct though very short pedicels.

# 54. PELTOPHORUM Vogel.

Tall unarmed trees. Leaves abruptly bipinnate. Flowers showy, yellow or white, in axillary and in panicled terminal racemes. Calyx with the disc confined to the base, teeth subequal, very deeply cut, imbricate. Petals oblong or roundish, imbricated, spreading. Stamens

10. free, declinate; filaments with a dense tuft of hairs at the base; anthers uniform, linear-oblong. Ovary sessile, free, few-ovuled; style long filiform incurved, stigma large peltate. Pod oblong, flat, thin, hard. indehiscent, with a firm broad wing on each suture. Species 7-8; cosmopolitan in the tropics.

Flowering pedicels not exceeding the calvx Flowering pedicels 3-4 times as long as calyx ...

... 1. P. ferrugineum. ... 2. P. dasyrachis.

1. Peltophorum ferrugineum Benth. Flor. Austral. II, 279. A tall tree 70-80 feet high; branchlets covered with a thin rusty tomentum. Leaves 6-12 in. long, petiole 1-1.5 in., sparingly rusty-pubescent; pinne 16-20, distal 4-6 in. long, progressively shortening towards proximal. 3-4 in.; leaflets close, ligulate-oblong, sessile, base unequal, apex obtuse, ·5-75 in. long, ·35 in. wide, subcoriaceous, puberulous above, faintly rusty-pubescent beneath. Racemes in a large terminal panicle 12 in. long. 8-9 in. across, branches 4-6 in. long, bracts linear under 1 in. long, very caducous, bud 35 in. in diam., pedicels 15-25 in. long, rachis, branches and pedicels densely rusty-pubescent. Calyx partite to 15 in. from base. lobes subequal, ovate-lanceolate, 25 in. long, densely rusty-pubescent externally. Corolla 1.25 in. wide, petals 8 in. long, yellow, the thickened base densely rusty-hairy on both sides, the blade more or less glabrous but the margin ciliate with rusty hairs. Stamens 10, free, filaments equal, pubescent at the base. Ovary densely villous, style very sparingly pubescent throughout, the stigma peltate. Pod 2-4 in. long, 1 in. across, narrowed to both ends, rigid, glabrous, closely longitudinally veined outside. Bak. in Flor. Brit. Ind. II, 257. Poinciana Roxburghii G. Don, Gen. Syst, II, 433. Cesalpinia inermis Roxb. Flor. Ind. II, 367. C. ferruginea Done, Nouv. Ann. Mus. II, 462; Miq. Flor. Ind. Bat. I, 111. C. arborea Zoll. Nat. en Geneesk. Arch. III, 65; Miq. Flor. Ind. Bat. I, 112,

Andamans; Kurz! NICOBARS; Jelinek 240! Heinig! KEDAH; Langkawi, Curtis 370! MALACCA; Griffith 1903! Hervey 2078! SINGAPORE; Ridley 265! JOHORE; Ridley 3977! DISTRIB. Borneo (Hullett); Java; Timor.

2. PRETOPHORUM DASYRACHIS Kurz ex Bak. in Flor. Brit. Ind. II, 257. A tall tree 70-80 feet high; branchlets covered with a fulvous tomentum. Leaves 6-15 in. long, petiole 1-1.5 in. long, tomentose; pinnæ 14-18, distal 4-5 in. long, shortening progressively towards proximal 2-2.5 in.; leaflets close, ligulate-oblong, sessile, base unequal, apex rounded, 5-75 in. long, 35 in. wide, subcoriaceous, puberulous above, slightly rusty-pubescent beneath. Racemes 6-9 in. long, 3 in. across, pedicels patent 1-15 in. long, bracts lanceolate, 5 in. long, subpersistent; bud 35 in. in diam.; rachis, pedicels and bracts rusty-pubescent. Calyx partite to 15 in. from base, lobes equal, ovate-lanceolate, 25 in. long,

densely rusty-velvety externally. Corolla 1.5 in. across, petals 1 in. long, oblong, yellow, the thickened base very densely hairy on both sides, the blade glabrous. Stamens 10, free, filaments equal, pubescent at the base. Ovary densely villous, style sparsely pubescent throughout, the stigma large peltate glabrous. Pod 4-5 in. long, 1.25-1.4 in. across, rigid, 1-5-seeded, narrowed at both ends, faintly puberulous and not veined externally. Cossalpinia Finlaysoniana Grah. in Wall. Cat. 5971. C. dasyrachis Miq. Flor. Ind. Bat. Suppl. 292.

Perak; Goping, Scortechini, 1994!. Trang, Kunstler 1394! 8172! MALACCA; common, Griffith! Maingay 560! Holmberg 884! Derry 1049! DISTRIB. Sumatra.

The native name in Malacca is "Batai" or "Kayu Batai."

There is a third species of *Peltophorum* in Sumatra (P. grande), a very tall tree with white flowers tinged with pink.

### 55. CÆSALPINIA Linn.

Robust erect trees, shrubs, or woody prickly climbers. Leaves large, abruptly bipinnate. Flowers showy, yellow, in copious axillary racemes. Calyx deeply cleft, with the disc confined to its base, the lobes imbricated, the lowest the largest, cucullate. Petals spreading, usually orbicular with a distinct claw, the uppermost smaller than the others. Stamens 10, free, declinate; anthers oblong, uniform, versatile. Ovary sessile or subsessile, few-ovuled; style filiform, sometimes clubbed at the tip, stigma terminal. Pod oblong or ligulate, thin and flat, or thicker and subturgid, indehiscent or dehiscent, smooth or (in subgen. Guilandina) armed all over with wiry spines. Species about 40, widely spread in the tropics of both hemispheres.

Pod armed with abundant wiry prickles; petals narrow
(Guilandina):—

Leaves stipulate, leaflets small, bracts squarrose .... 1. C. Bonducella.
Leaves without stipules, leaflets larger, bracts ascending ... 2. C. Bonduc.

Pod unarmed, petals broad:—

Pod dry, thin-valved with narrow sutures (Eucesalpinia):—
Leaflets few, coriaceous, large; pods short, seeds solitary or rarely 2 (§ Nugaria) ... ... 3. C. Nuga.

tary or rarely 2 (§ Nugaria) ... ... 3.

Leaflets many, membranous or subcoriaceous, small; pods longer than broad, seeds 5-8:—

Stamens long, far-exserted; petals long-clawed (§ Cxsalpinaria)... ... ... ... 4. C. pulcherrima. Stamens short, little-exserted; petals short-clawed

Stamens short, little-exserted; petals short-clawed (§ Sappania):—

Petals orbicular, flowers '75 in. across:—
Stipules 0, petals subequal, pod wingless broadly
blunt-pointed with recurved beak

blunt-pointed with recurved beak ... 5. C. Sappan.

Stipules large, upper petal smaller than the others, pod narrowly winged along ventral suture, obliquely round-pointed with straight beak Petals oblong (subequal), flowers only '3 in. across, (pod wingless, broadly blunt-pointed with straight

... 6. C. sepiaria.

... 7. C. parviflora. Pod somewhat fleshy, thick-valved with wide sutures

(CINCLIDOCARPUS):-

Leaflets oblong; racemes lax, pedicels much exceeding calvx \*\*\* ... 8. C. digyna. ... Leaflets ligulate, racemes denser, pedicels hardly exceed-

ing calyx ... ... 9. C. tortuosa.

Subgen, 1. Guilandina Bak. Pod dry, armed on the face with abundant wiry prickles; petals narrow.

1. CESALPINIA BONDUCELLA Fleming, Asiat. Research. XI, 159. A climber, often very extensive, with finely grey-downy branches armed with many small hard falcate yellow prickles. Leaves 1 to 2 feet long, with a pair of reduced pinnæ (or compound stipules) at their base; pinnæ 12-16, 2-3 in. long, slightly lengthening upwards, leaflets 12-18, membranous, rather pale-green, ovate or elliptic, base slightly unequally rounded, apex cuneate or rounded mucronulate, 5-1 in. long, 3-6 in. wide, glabrous above, slightly puberulous beneath, more closely on the margins, petiolules very short; lobes of compound stipules sub-Racemes terminal and slightly supra-axillary, simple or orbicular. panicled, dense at top, laxer downwards, 6-10 in. long; pedicels 2 in. (in fruit '3 in.) long, with squarrose reflexed lanceolate deciduous bracts 25-3 in. long, finely brown-downy as are the pedicels and main-rachis. Calyx 25-3 in. long, closely downy. Petals oblanceolate, little exserted, yellow except the broader shorter ovate-acute upper with reddish base. Stamens densely grey-silky, declinate. Pcd short-stalked, oblong, 2-3 in. long, 1.75 in. wide, densely strongly aculeate externally. Seeds usually 2, oblong, lead coloured, 5 in across. Roxb. Flor. Ind. II, 357; Bak. in Flor. Brit. Ind. II, 254. Guilandina Bonducella Linn. Sp. Pl. 381; Wall. Cat. 5803. G. Bonduc W. & A. Prodr. 280 in part; Miq. Flor. Ind. Bat. I, 113 in part.

Andamans; common on the coasts. Penang; Curtis 99! Cosmopolitan in the tropics.

2. CESALPINIA BONDUC Roxb. Hort. Beng. 32. A large shrubby creeper often very extensive, with sparingly pubescent branches armed with rather strong falcate brown prickles. Leaves 1-2 feet long, without stipules; pinnæ 8-16, 5-8 in. long, slightly lengthening upwards, leaflets 12-14, papery, ovate, base subequally rounded, apex cuneate mucronate, 1.5-2 in. long, 75-1 in. wide, dark-green shining glabrous above, rather closely puberulous beneath, petiolules 08 in. long. Racemes

terminal and supra-axillary simple or panicled, rather lax throughout, 6-12 in. long; pedicels '2 (in fruit '3) in. long, with membranous lanceolate deciduous bracts '2 in. long, finely brown-pubescent as are the pedicels and main-rachis. Calyx '2-'25 in. long, closely downy, light-green, tinged with pink. Petals oblanceolate, little exserted, yellow. Stamens silky, declinate. Pod rather distinctly stipitate, oblong, 5 in. long, 2.5 in. wide, sparsely strongly aculeate externally. Seeds usually 4, oblong, 5 in. across. Roxb. Flor. Ind. II, 362; Bak. in Flor. Brit. Ind. II, 255. Guilandina Bonduc Linn. Sp. Pl. 381; DC. Prodr. II, 480; Wall. Cat. 5806; W. & A. Prodr. 280 in part; Miq. Flor. Ind. Bat. I, 113 in part.

NICOBARS; King's Collector! PENANG; Wallich 5806! PAHANG; Ridley 2650! PERAK; Scortechini 1062! Kunstler 7147! Wray 3089! DISTRIB. Cosmopolitan in the tropics.

SUBGEN. 2. EUGÆSALPINIA. Pod dry, unarmed, valves thin; petals broad.

- § 1. NUGARIA DC. Leaflets few coriaceous shining; petals short-clawed; stamens not far exserted; seeds 1, rarely 2.
- CÆSALPINIA NUGA Ait. Hort. Kew. III, 32. A very extensive littoral climber, with glabrous green branches armed with very strong, short, hard, dark, hooked prickles. Leaves 6-12 in. long, pinnæ 6-8, rather remote, subequal, 2-3 in. long, leaflets 4 or (oftener) 6, rigidly coriaceous, dark-green and shining above, ovate, acute or very rarely obtuse, base slightly unequally rounded or sometimes cuneate, 1-2.5 in. long, 5-1 in. wide, quite glabrous on both surfaces; petiolules 15 in. long. Racemes in a terminal panicle extending into the axils of the uppermost leaves, 10-15 in. long, 6-8 in. across, individual racemes 2.5-3 in. long; pedicels 3 (in fruit 5) in long, with small ovate-lanceolate deciduous bracts 'I in. long. Calyx '25-'3 in. long, leathery, quite glabrous. Corolla '5 in. across, fragrant, petals yellow, orbicular except the rather smaller ovate-acute upper blotched with red. Stamens densely woolly at base, declinate. Pod 2 in. long, 1.35 in wide, oblong, beaked, hard, slightly turgid, indehiscent. Seed solitary, black, 1 in. long, 75 in. wide. DC. Prodr. II, 481; Miq. Flor. Ind. Bat. I, 108; Bak. in Flor. Brit. Ind. II, 255. Cæsalpinia paniculata Desf. Cat. ed. 2, 210; Roxb. Hort. Beng. 32; DC. Prodr. II, 481; Roxb. Flor. Ind. II, 364; W. & A. Prodr. 281: Wight, Ic. t. 36. C. sumatrana Wall. Cat. 5831 B, C, not of Roxb. C. bijuga Wall. Cat. 5833, not of Sw. C. scandens Kenig in Roth, Nov. Sp. 289; DC. Prodr. II, 482; Wall. Cat. 5829. Guilandina Nuga Linn. Sp. Pl. ed. II, 545. Nuga sylvarum Rumph. Herb. Amboin. V, t 50.

Andamans; very common on all the coasts and near muddy creeks.

NICOBARS; common. Kedah; Pulo Langkawi, Curtis 2618! 2867! Perak; Scortechini 1096! Kunstler 1029! Malacca; Griffith 1898! Pahang; Bidley 1377! Distrib. Coasts of S.-E. Asia, North Australia and Western Polynesia.

The nearest ally of this species is not any plant known as a Cæsalpinia, but a species from China known as Mezoneuron sinense.

- § 2. Cesalpinaria Bth. & Hk. f. Leaflets small, numerous, membranous; petals very long-clawed; stamens very far exserted; seeds 6-8.
- 4. CESALPINIA PULCHERRIMA Sw. Obs. 166. A shrub with glabrous unarmed or very sparsely and weakly prickly branches. Leaves 4-6 in. long, pinnæ 12-16, 2-4 in. long, the proximal and distal rather shorter than those between, leaflets 16-24, distinctly petiolulate, close, membranous, elliptic-oblong, apex obtuse, base slightly oblique, cuneate on upper rounded on lower side, 5-7 in. long, 35-45 in. wide, dark-green, glabrous on both surfaces. Racemes terminal and axillary, simple or very sparingly branched, 8-12 in long, at length subcorymbose, 4-6 in. wide, pedicels ascending, the lowest reaching 3-4 in. in length; bracts subulate 2 in. long, very early caducous. Calyx 6 in. long, quite glabrous, leathery, the lower segment very large and deeply cucullate, 4 in wide. Corolla spreading, 1.5 in. across, all petals long-clawed, the lower four '75 in. long, yellow or red, lamina orbicular with crisped margin, '5 in. in diam., the upper smaller. Stamens far-exserted, red, glabrous, 1.75 in. long. Pod thin, flat, ligulate, glabrous, nearly straight, 2-3 in. long, 6 in. wide; seeds 6-8, broadly oval, compressed, brown, '4 in. long, '3 in. wide. Benth. Pl. Jungh. 258; Miq. Flor. Ind. Bat. I, 111; Bak. in Flor, Brit. Ind. II, 255. Poinciana pulcherrima Linn. Sp. Pl. 380; DC. Prodr. II, 484; Bot. Mag. t. 995; Wall. Cat. 5813; Roxb. Flor. Ind. II, 355; W. & A. Prodr. 282. Rheede, Hort. Malab. VI, t. 1; Rumph. Herb. Amboin. II, t. 20.

A garden or hedge plant in most of our provinces.

The native country of this species is uncertain, but apparently it is not anywhere truly wild in S.-E. Asia. The other species of the section are American, so that this one has perhaps also been originally derived from the Western Hemisphere.

- § 3. SAPPANIA DC. Leaflets many, membraneus, small; petals short-clawed; stamens not far exserted; seeds 3-6.
- 5. CASALPINIA SAPPAN Linn. Sp. Pl. 381. A tree 20-30 feet high with thorny stem 6-10 in. in diam.; branches rusty-pubescent with few small prickles. Leaves 8-15 in. long, pinnæ 16-24, 4-6 in. long; leaflets 20-36, close, membranous or chartaceous, oblong, very oblique, sessile, attached at lower corner, apex obtuse or slightly retuse, 5-75 in. long, 35 in. wide, glabrous above, slightly puberulous on the nerves

beneath. Rucemes in a terminal panicle extending into the axils of the uppermost leaves, 12-16 in. long, 8 in. across, individual racemes 4-6 in. long; pedicels '5-'6 in. long, bracts lanceolate '3 in. long, very deciduous. Calyx '4 in. long, leathery, glabrous. Corolla '75 in. across, petals bright-yellow, the upper with a pinkish basal patch, all orbicular subequal. Stamens waxy-white, densely woolly at base, declinate. Ovary grey-velvety. Fod 3-4 in. long, 1'5-2 in. wide, subcompressed, polished, indehiscent, with a hard recurved short beak at upper angle of obtuse apex. Roxb. Cor. Pl. I, 17, t. 16; Hort. Beng. 32; DC. Prodr. II, 482; Wall. Cat. 5838; Roxb. Flor. Ind. II, 357; W. & A. Prodr. 281; Miq. Anal. Ind. I, 9; Flor. Ind. Bat. I, 108; Bedd. Flor. Sylvat. 90; Anal. Gen. t. 13, f. 1; Bak. in Flor. Brit. Ind. II, 255. Biancea Sappan Todaro, Hort. Bot. Panorm. 3. Lignum Sappan Rumph. Herb. Amboin. IV, t. 21.

Perak; open jungle at foot of hills, Ulu Bubong, Kunstler 10567! Pahang; Pulo Changei, Ridley 2590! Distrib. India, Indo-China; Malay Archipelago.

6. Cæsalpinia sepiaria Roxb. Hort. Beng. 32. A moderate climber with stout woody stem and somewhat densely grey- or brown-pubescent branches armed with strong sharp prickles. Leaves stipulate, 9-15 in. long; pinnæ 12-20, 2-3 in, long, subequal, leaflets 16-24, very shortly petiolulate, close, membranous, oblong, apex obtuse, base rounded on both sides, slightly oblique on upper, 5-8 in. long, rather pale-green glabrous above, glaucous and slightly pubescent beneath; stipules very obliquely ovate with crisped margins, long-acuminate apex, and with projecting auriculate lower angle of base, 5 in. long, 3 in. wide, soon deciduous. Racemes terminal and axillary all simple, drooping, 6-12 in. long, 2-25 in. across, pedicels erecto-patent, 75 in. long, bracts large ovate-lanceolate caducous, 4 in. long, densely pubescent. Calyx 5 in. long, densely pubescent. Corolla spreading, 75 in. across, petals bright vellow, all orbicular, 5 in across except the upper only 25 in in diam. Stamens little exserted, declinate, greenish-white, densely woolly in the lower half. Pod indehiscent, linear-oblong, 3-5 in. long, 1.2 in. across, sublignose, glabrous, slightly recurved and slightly turgid, rather strongly reticulate-veined especially in the half next lower suture; upper suture dilated into a narrow wing; faces slightly depressed between the 6-8 mottled seeds, 4 in. long, 3 in. wide. Wall. Cat. 5834; Roxb. Flor. Ind. II, 360; W. & A. Prodr. 282; Wight, Ic. 37; Miq. Flor. Ind. Bat. I, 109; Bak. in Flor. Brit. Ind. II, 256. C. ferox Hassk. Pl. Jav. Rar. 400. C. japonica Sieb. & Zucc. Fl. Jap. 9. C. crista Thunb. Flor. Jap. 179, not of Linn. Reichardia decapetala Roth. Nov. Sp. 9; DC. Prodr. II, 484. Biancea scandens Todaro, Hort. Bot. Panorm. 4, t. 1.

Penang; Govt. Hill, 2500 feet, Curtis, 385! DISTRIB. Eastern and South-Eastern Asia, introduced in America.

7. CESALPINIA PARVIFLORA Prain. A small tree or, at times, a climber, with stem 8-12 in. in diam. and with rusty-pubescent branches sparingly armed with small prickles. Leaves stipulate 8-10 in. long. pinnæ 18-24, 2-3 in. long; leaflets 30-36, close, firmly subcoriaceous, oblong, sessile, attached sub-centrally but with the lower corner subauriculately produced, apex obtuse or rounded, 35-5 in. long. ·2-·25 in. wide in VAR. typica, ·75 in. long, ·35 in. wide (or rarely even larger) in. VAR? stipularis, dark-green glabrous and shining above, dull beneath and glabrous in VAR. typica, sparsely puberulous on the midrib in var? stipularis; stipules lanceolate or oblong 45-75 in. long. Racemes in an ample terminal again branching panicle extending into the axils of the upper leaves, 2-3 feet long, 12-15 in. across, primary branches 5-8 in. long, final individual racemes 3 in. long; pedicels 25 in. long, slender, densely puberulous as are the main-rachis and branches of panicle; bracts linear or lanceolate, 2-25 in. long, deciduous. Calyx 25 in. long, thinly coriaceous, puberulous. Corolla 3 in. across, petals greenish-yellow, oblong, subequal, hardly exserted. Stamens green, densely woolly at base. Ovary sparsely pubescent. Pod . of var. typica 1 in. long, '5 in. wide, with a recurved beak at upper augle of obtuse apex; seeds (young) oval, 4, 25 in. long.

VAR. typica; leaflets not exceeding 5 in. in length, glabrous beneath; stipules lanceolate, 45 in. long, 2 in. wide, margin entire; bracts linear, 2 in. long, hardly equalling the pedicels.

PERAK; at low elevations, Kunstler 3499! 7584! Wray 1909!

VAR.? stipularis; leaflets '75 in length or longer, the midrib beneath puberulous; foliaceous stipules broadly ovate-oblong, '75 in. long, 35 in. wide, continued in the leafless portion of the more diffusely branching and more densely puberulous inflorescence, their margins often incised; bracts lanceolate, 25 in. long, equalling the pedicels.

PERAK; Larut, in the plains, Wray 3983! 3991! 426!!

The foliage of the typical variety of this species is very like that of C. cinclidocarps Miq. or C. tortuosa Roxb. but the remarkably small flowers and the different fruit (which is exactly like a minature C. Sappan pod) abundantly distinguish it from all other Indo-Malayan species.

The pod of VAR? stipularis is not yet known and it may ultimately be necesary to separate it specifically from C. parviflora. But its flowers, except that the calyx is somewhat more puberulous, are exactly as in C. parviflora, and though var? stipularis has a somewhat different facies on account of its larger leadets and especially its much longer foliaceous subpersistent stipules, it seems better in the meantime to treat it tentatively as no more than a variety of C. parviflora. Wray notes that war. typica is a "small tree;" Kunstler states on one occasion that it is

a tree 30-40 feet high, on another that it is a climber 100-150 feet long. Of all three gatherings of VAR.? stipularis it is noted that the plant is a climber.

SUBGEN. 3. CINCLIDOCARPUS Bak. Pod rather fleshy, indehiscent, naked on the faces, with thickened sutures. Petals broad.

8. CESALPINIA DIGYNA Rottl. ex Willd. Nov. Act. Nat. Cur. IV. 198 t. 3. A climber with glabrous or slightly downy branches armed with scattered prickles. Leaves 6-9 in. long, pinnæ 8-9, 1.5-2.5 in. long increasing upwards, leaflets 16-20, close, membranous, oblong, obtuse, sessile, base subequally rounded, 35-45 in. long, 25 in. wide. medium-green and glabrous above, greyish and obscurely downy beneath; stipules subulate, membranous, very early deciduous. Racemes simple axillary, 8-12 in. long, 3 in. wide, pedicels distant slender horizontal or slightly deflexed, I in. long, glabrous as is the main-rachis. Calux leathery, quite glabrous, 3 in. long. Corolla spreading, 75 in. across, petals orbicular, 3 in. in diam., subequal, yellow except the upper slightly streaked with red. Stamens little exserted, filaments greenishwhite, densely woolly in the lower half, declinate. Pod rather fleshy, indehiscent, oblong, glabrous, with much thickened sutures, 1.5-2 in. long, 1 in. across, turgid, torulose; seeds 2-4, black, ovoid, 5 in. long, 4 in. wide. DC. Prodr. II, 482; Wall. Cat. 5839; W. & A. Prodr. 281: Bak. in Flor. Brit. Ind. 11, 256. C. oleosperma Roxb. Hort. Beng. 32; Fl. Ind. II, 356. C. flavicans Grah. in Wall. Cat. 5825. C. gracilis Mig. Flor. Ind. Bat. I, 110. Pterolobium lacerans Wall. Cat. 5841 letters F, H, and I; not of R. Br.

MALACCA; Griffith! PENANG; Curtis 448! TONGKAH; Curtis' Collector 2862! DISTRIB. India, Indo-China, Malay Archipelago.

9. Cæsalpinia tortuosa Roxb. Hort. Beng. 32. A stout subscandent straggling shrub, with slightly downy spreading branches armed with very strong prickles. Leaves 12-18 in. long, pinnæ 30-40, 2:5-4 in. long, the proximal and distal rather shorter than those between, leaflets 40-60, sessile, close, rigidly subcoriaceous, narrowly ligulate, apex obtuse or rounded, base obliquely cuneate, 25-3 in. long, 1 in. wide, dark-green, glabrous on both surfaces, shining above. Racemes axillary, simple, erect, 15-18 in. long, 1.5 in. across, pedicels spreading, 5 in. long, slender, glabrous as is the stout rachis, bracts very small caducous. Calya 5 in. long, leathery, quite glabrous, the lower segment very deeply cucullate, 35 in. wide. Corolla spreading, 75 in. across, petals bright-yellow with red streaks near base, all orbicular clawed, 5 in. across except the upper only 25 in. in diam. Stamens littleexserted, declinate, green, densely woolly in lower half. Pod oblong, twisted, indehiscent, glabrous, with much thickened sutures, 2-3 in. long, 1 in. across, turgid, torulose; seeds 2-5, hard, smooth, dark-brown,

4 in. across. Wall. Cat. 5827, A, B, and C.; Roxb. Flor. Ind. II, 365; Miq. Flor. Ind. Bat. I, 109; Bak. in Flor. Brit. Ind. II, 257.

Penang; Penara Bukit, 700 feet, Curtis 1027! DISTRIB. Sumatra, Tenasserim.

Very nearly related to C. cinclidocarpa Miq. which differs by its branching inflorescence and its pubescent calyx; also to C. acanthobotrya Miq. which has shorter, more laxly-flowered racemes and broader leaflets. Mr. Kurz indeed has in Herb. Calcutta proposed to treat C. acanthobotrya as a variety (VAR. latifolia) of C. tortuosa but the examination of an authentic example of Dr. Miquel's plant leads the writer to believe that it is better, at least at present, to consider it specifically

### 56. MEZONEURON Desf.

Robust woody prickly climbers. Leaves abruptly bipinnate. Flowers in ample panicled racemes. Calyx very oblique, usually deeply cleft, with a basal or intertubal disc, the lobes imbricated, the lowest largest covering the others in bud like a hood. Petals spreading, obovatespathulate, subequal or the upper smallest. Stamens free, declinate, usually exserted; anthers oblong, uniform. Ovary sessile or shortly stipitate, declinate, few- or many-ovuled; style filiform, stigma small, capitate, the margin often fringed. Pod large, thin, oblong, flat, indehiscent, with a broad wing down the upper suture; seeds compressed, orbicular, cotyledons flat, radicle straight. Species about 15; all in the tropics of Eastern Hemisphere.

Calyx deeply cleft, with a wide short tube and a basal disc, the anterior lobe deeply cucullate (Eumezoneuron):-

Leaflets opposite, large; pods 1-seeded Leaflets alternate, medium to small; pods several seeded :---

... 1. M. cucullatum.

Leaflets beneath and calyx externally puberulous ... 2. M. hymenocarpum. Leaflets beneath and calyx externally glabrous:-

Pedicels puberulous, jointed near base of calyx; leaflets coneate at apex ...

3. M. Kunstleri.

Pedicels glabrous, jointed considerably below base of calyx; leaflets obtuse

4. M. andamanicum.

Calyx shallowly cleft, with a narrow long tube and a disc extending above the base, anterior lobe shallowly hooded (Tubicalya); (leaflets alternate) ...

Subgen. 1. Eumezoneuron; calyx deeply cleft, disc basal; lower lobe deeply cucullate.

1. MEZONEURON CUCULLATUM W. & A. Prodr. 283. A large climber, branches glabrous armed with small dark short recurved prickles. Leaves 6-12 in. long, pinnæ 4-10, 6-8 in. long; leaflets 8-10, opposite, rigidly subcoriaceous, ovate-acute, base wide-cuneate slightly unequal, 2-4 in. long, 1-25-1-75 in. wide, glabrous on both surfaces, dark-green

above, paler beneath, secondary veins 4-5 pairs and intermediate reticulations faint; petiolules 2 in long. Inflorescence a terminal or axillary panicle of simple or occasionally branched racemes, 1-1.5 feet long, with terete glabrous main-rachis; single racemes 4-8 in long; pedicels close-set, slender, 3 in long, jointed a little above the middle. Calyx yellow, quite glabrous, leathery, anterior sepal cucullate, obtuse, 25 in long, the rest orbicular, tube shallow. Corolla 45 in across, pale-green, standard 2-lobed, shorter but wider than the other subequal orbicular 4. Stamens far exserted, puberulous at base, declinate, unequal. Ovary declinate, 1-2-ovuled. Pod thin, 3-3.5 in long, 1.25 in wide (including wing 3 in wide), faintly reticulated; seeds usually solitary, very rarely 2.

Andamans; common. Distrib. Eastern Himalaya, India, Indo-China.

2. MEZONEURON HYMENOCARPUM W. & A. Prodr. I, 283. A large climber, branches finely puberulous, with a few scattered recurved brown prickles. Leaves 1-1.5 feet long, pinnæ 1-10, 3-4 in. long, leaflets 10-14, alternate or subopposite, rigidly subcoriaceous, obovate, apex obtuse or rounded, base cuneate unequal, 5-1 in. long, 25-6 in. wide, puberulous above, puberulous to densely pubescent beneath, secondary veins 5-6 pairs very faint; petiolules 15 in. long. Inflorescence a large terminal thyrsoid panicle of unbranched racemes extending into the axils of the uppermost leaves, 2 feet long, 8-10 in. wide, the single racemes 6-8 in. long, puberulous as are the main-rachis and slender pedicels, 35-5 in. long, jointed 15 in. under base of calyx. Calyx densely puberulous, leathery, anterior sepal cucullate subacute, 25 in. long, the others orbicular. Corolla 5 in. across, yellow, petals ovate. orbicular, upper small. Stamens far exserted, hirsute at base, declinate, unequal. Ovary declinate, about 5-ovuled; stigma slightly fringed. Pod thin, 4 in. long, when ripe 1 in. wide (including posterior wing 25-3 in wide), faintly wide-reticulated, 5-seeded. Cæsalpinia hymenocarpa Wall. Cat. 5832. Mezoneuron pubescens Bak. in Flor. Brit. Ind. II, 259 not of Desf.

Andamans; very plentiful near Port Blair, King's Collectors! DISTRIB. Burma; Ceylon.

Resembles M. andamanicum but is easily distinguished by its leaves and its calyx being pubescent; by its pedicels being shorter; and by its pods being smaller and not so distinctly reticulated.

3. MEZONEURON KUNSTLERI Prain. A large climber, branches glabrous, with a few brown scattered recurved prickles. Leaves 6-8 in. long, piunæ 4-6, 4-5 in. long, leaflets 6-8, alternate, subcoriaceous, ovate, cuneate at apex and base, almost equally decurrent on the short petiolule,

5-125 in. long, 35-75 in. wide, glabrous on both surfaces, dark-green above, glaucescent beneath, secondary veins few, faint, widely reticulated; petiolules 15 in. long. Inflorescence a large terminal thyrsoid panicle of unbranched racemes 1.5-2 feet long, 8-9 in. wide, the single racemes 8-10 in. long, faintly puberulous as in the main-rachis; pedicels slender 35-45 in. long, distinctly puberulous, jointed 2 in. under base of calyx. Calya quite glabrous, leathery, anterior sepal deeply cucullate obtuse, 25 in. long, the rest orbicular, all gland-dotted as is the shallow tube. Gorolla 5 in. across, bright-yellow, petals ovate-orbicular, upper smaller than the others. Stamens far exserted, hirsute at base, declinate, unequal. Ovary declinate, about 5-ovuled; stigma slightly fringed. Pod only seen very young; wing half as wide as body of pod.

PERAK; Sungah Ryah, Kunstler 895!

A species very near M. andamanicum, with which it agrees in number, size, and disposition of leaflets, and which it closely resembles in flowers. The different shape of the leaflets, however, and especially the much shorter distance between the joint in the pedicel and the base of the calyx, with the much shorter pubernlous pedicels, mark it as abundantly distinct. The wing, too, of the very young pod is in M. Kunstleri almost twice as wide as the wing in the corresponding stage of the pod

4. MEZONEURON ANDAMANICUM Prain, Journ. As. Soc. Beng. LXI, 2. 131. A large climber, branches glabrous with a few scattered prickles. Leaves 1-1'5 feet long, pinnæ 4-10, 5-7 in. long, leaflets 8-10, alternate, rigidly subcoriaceous, obovate, slightly retuse, base cuneate slightly unequally decurrent on the short petiolule, 5-1.5 in. long, ·35-I in. wide, glabrous on both surfaces, dark-green above, pale beneath, secondary veins few faint widely reticulated; petiolules 15 in. long. Inflorescence a large terminal thyrsoid panicle of unbranched racemes extending into the axils of the uppermost leaves, 2-2.5 feet long, 1 foot wide, the single racemes 10-12 in. long, quite glabrous as are the mainrachis and the slender pedicels 5-75 in. long, jointed 3 in. under base of calyx. Calyx quite glabrous, leathery, auterior sepal deeply cucullate obtuse, 25 in long, the rest orbicular all reticulate-veined and yellow gland-dotted as is the shallow tube. Corolla 5 in. across, rather paleyellow, petals ovate-orbicular, the upper smaller than the others with a thickened claw prolonged into a ligular ciliate ridge, the rest with claw hirsute internally and with lamina red-blotched at base and pinkveined. Stamens far exserted, hirsute at base, declinate, 2 seriate, free, unequal. Ovary declinate, ovules about 6; stigma slightly fringed. Pod thin, 5 in long, when ripe 1-1.5 in. wide (including posterior wing ·25-35 in. wide), finely wide-reticulated, distantly 3-5-seeded.

ANDAMANS; very common near Port Blair, Prain! Man! King's Collector! 234

SUBGEN. 2. TUBICALYX Miq. Flor. Ind. Bat. I, 1081. Calyx shallow-ly cleft, the disc extending above the base, lower lobe shallow-cucullate.

5. MEZONEURON SUMATRANUM W. & A. Prodr. I, 283. A large climber, branches glabrous, armed with a few dark short recurved prickles. Leaves 1-1.5 feet long, piunæ 6-10, 8-12 in. long, leaflets 6-8, alternate, rigidly subcoriaceous, obovate-oblong, emarginate and apiculate, base rounded very slightly unequal, 1.5-2.5 in. long, 1.25-1.75 in. wide, glabrous on both surfaces, dark-green above, paler beneath, secondary veins rather promineutly closely reticulate beneath; petiolules 2 in. long. Inflorescence a terminal or axillary panicle of simple or occasionally branched racemes 1.5-2 feet long, with terete thick glabrous main rachis, single racemes 5-6 in. long; pedicels close-set slender, ·25 long, curved. Calyx quite glabrous, leathery, anterior sepal orbicular 25 in. long, twice as large as the others, tube compressed 5 in. long. Corolla '35 in. wide, '5 in. long, of 5 subequal petals, oblong, narrowed to the base, the standard reddish the other petals yellowish. Stamens hardly exserted, declinate, glabrous, unequal. Ovary declinate stipitate glabrous, 3-4-ovuled, stigma glabrous. Pod thin, 3-4 in. long, 135 in. wide (including posterior wing 25 in. wide), finely wide-reticulate, distantly 3-4-seeded. Mig. Flor. Ind. Bat. I, 105 and I, 1081; Bak. in Flor. Brit. Ind. II, 259. Cæsalpinia sumatrana Roxb. Hort. Beng. 32; Flor. Iud. II, 366; Wall. Cat. 5831 A only.

MALACCA; Griffith! Maingay 534! PERAK; Thaipeng, Scortechini 67! Kwala, Scortechini 1766! Simpat, Ridley 3083! DINDINGS; Lumot, Ridley & Curtis! SINGAPORE; near Krangi, Ridley 2105! 6026!

The great difference in the appearance of the calyx no doubt justifies Dr. Miquel's proposal to treat this plant as the type of a distinct subgenus of Mezoneuron.

### 57. PTEROLOBIUM R. Br.

Robust woody prickly climbers. Leaves abruptly bipinnate. Flowers in panicled racemes. Calyx deeply cleft, with the disc near the base, the lobes imbricated, the lowest longer and more hooded than the others. Petals spreading, oblong and clawed equalling the calyx. Stamens 10, free, declinate, little exserted; anthers oblong versatile. Ovary sessile, 1-ovuled; style filiform, stigma small terminal. Pod indehiscent, samaroid with a large horny oblique terminal wing. Species 7; one African, one Australian, two Chinese, three South-East Asiatic.

Racemes with thin angular glabrous rachis, laxly 20-30-fld., pedicels longer than calyx ... ... 1. P. macropterum.

Racemes with stout terete puberulous rachis, densely
150-200-fld., pedicels not longer them calyx ... 2. P. densiforum.

Pterolobium macropterum Kurz, Journ. As. Soc. Beng. XLII,
 71. A large climber, young branches sparsely pubescent, all parts

sparingly armed with small prickles. Leaves 6-9 in. long; pinnæ 14-16, 2-2·5 in long with puberulous rachis; leaflets 14-20, elliptic-oblong, apex rounded or obtuse, base unequal, abruptly rounded on upper, narrow-cuneate on lower side, '45 in. long, '25 in. wide, chartaceous, dark-green above, paler beneath, glabrous on both surfaces. Racemes lax, in spreading terminal and axillary panicles with glabrous slender angular rachis and branches, 8 in. long, 4 in. across, individual racemes 3-4 in. long, 20-30-fld.; pedicels glabrous slender spreading, '4-6 in. long. Calyx glabrous, thinly coriaceous, lowest sepal '25 in. long. Corolla white, '25 in. long. Pod 2·5-2·75 in. long, glabrous; seed-bearing base turgid reticulate, '75 in. long, '5 in. wide, wing '7-8 in. wide, the upper margin straight or slightly recurved thickened, the lower thin irregularly sinuately convex, the apex rounded. Pterolobium lacerans Miq. Flor. Ind. Bat. I, 106 not of R. Br., nor of Wall., nor of Wight. 'P. indicum·var. macropterum Bak. in Flor. Brit. Ind. II, 259.

Andamans; very common. DISTRIB. JAVA; Burma.

This species is not so closely related to *P. lacerans* R. Br., with which Dr. Miquel has identified it, as it is to *P. indicum* A. Rich. (*P. lacerans* Wall.; W. & A.; Wight, Ic.) of which Mr. Baker treats it as a variety. *P. macropterum* has however quite glabrons flower branches, very different leaflets, and fewer and smaller prickles; while it agees with *P. indicum* in length of pedicels and in style of inflorescence, it has very different pods with a much larger wing.

PTEROLOBIUM DENSIFLORUM Prain. A large climber, young branches pubescent, all parts very strongly armed with large recurved prickles. Leaves 4-8 in. long, pinnæ 8-16, 3 in. long, with puberulous rachis; leaflets 14-16, rather narrow-oblong, apex obtuse or retuse, base unequal abruptly rounded on both sides, 6 in. long, 25 in wide, subcoriaceous, dark-green, glabrous on both surfaces. Racemes dense in fastigiate terminal panicles with stout subterete puberulous rachis and branches; 15 feet long, 1 foot across, individual racemes 150-200-fid., 6-8 in long; pedicels puberulous slender spreading, 25 in long. Calyx sparsely puberulous, thinly coriaceous, lowest sepal 3 in. long. Corolla yellow, 3 in. long. Pod 2 in. long, glabrous; seed-bearing base turgid, reticulate, 6 in. long, 5 in. wide, wing 5-7 in. wide, the upper margin straight thickened, the lower thin irregularly sinuately convex, the apex narrowly rounded. P. microphyllum Kurz, Journ. As. Soc. Beng. XLII, 2, 71 not of Miq. P. indicum VAR. microphyllum Bak. in Flor. Brit. Ind. II, 259 in part, and excl. the plant of Miquel.

Penang; Government Hill, 2500 feet, Curtis 3093! MALACCA;

Maingay's plant here cited is the same as that of Curtis both as regards flowers and fruits. The description of the leaflets is taken from the Penang plant, the Malacca one at Calcutta having only bare rachises. The Malacca plant is the type

of P. microphyllum Kurz; that it cannot possibly be the true P. microphyllum Miq. is obvious from the fact that Miquel's plant has linear leaflets smaller than those of his P. laserans—which is the P. macropterum of this work—arranged in from 20-22 pairs on 14-16 pairs of pinnæ, whereas P. densiforum has oblong leaflets larger than those of P. macropterum, arranged in from only 7-8 pairs on 4-8 pairs of pinnæ. Mr. Kurz's misidentification no doubt arose from the fact that he had not seen the leaves of Maingay's plant. In style of inflorescence P. densiforum most resembles the Chinese P. punctatum Hemsl., but that plant has less dense and less numerously flowered racemes, and has very different leaves.

## SUBORDER III. MIMOSEÆ.

Trees, shrubs or very rarely herbs. Leaves 2-pinnate, very rarely simply pinnate. Flowers small, rarely elongated, tubular, sessile in globose heads or cylindric spikes, rarely shortly pedicelled and in globose umbels or slender racemes; bracts small narrow often dilated at the tips, substrobilately imbricate in bud usually deciduous during flowering; bracteoles very rare; perianth regular often in 5-merous, sometimes 4-merous, rarely 3-merous or 6-merous whorls. Sepals valvate (except in Parkiese), rarely free, usually connate in a 5-toothed to 5-lobed tube, sometimes 0; disc-tube 0. Petals as many as sepals, valvate, free or connate in a lobed tube, hypogynous or obscurely perigynous. Stamens as many, or twice or thrice as many, as petals, or indefinite, free or monadelphous, or adnate to base of corolla tube, usually exserted: anthers small, versatile, dehiscing longitudinally. Ovary free at base of calyx. Seeds usually ovate or orbicular, compressed, with basilar hilum; rarely thick globose or ovoid; testa hard, albumen 0, or scanty; cotyledons flat; radicle straight, shortly exserted or included; funiculus often expanded in a small fleshy arillus.

Anthers gland-tipped; (stamens 5-10):-Calyx-teeth short, imbricated (Parkiew); filaments usually either connate or aduate at base; (inflorescence capitate; heads very large; trees) 58. PARKIA. Calvx valvate (Adenantherex); filaments free: Inflorescence elongated; (species all woody):-Flowers sessile; great climbers with opposite leaflets and luge pods and seeds 59. ENTADA. Flowers short-stalked; trees with alternate leaflets and narrow contorted pods ... 60. ADENANTHERA. Inflorescence capitate; heads small:-Small aquatic or subaquatic herbs with small thin pods opening early by upper suture; seeds small 61. NEPTUNIA. Lofty trees with large thick woody pods, late in dehiscing, opening by both sutures; seeds large 62. XYLIA. Anthers not gland-tipped; (calvx valvate, rarely 0):-Filaments free :-Stamens definite, as many, or twice as many as petals

(Eumimoseæ); (inflorescence capitate in Malayan species); shrubs or under-shrubs with thin coriaceous pods:—
Pods straight with continuous valves, dehiscing
through sutures 63. Leucæna.  Pods slightly curved with usually segmented valves
and with always indehiscent persistent sutures 64. Mimosa. Stamens indefinite often very numerous (Acacieæ);
inflorescence spicate or capitate 66. ACACIA. Filaments more or less connate (Ingex); (stamens usually
indefinite, rarely only 2-3-times as many as petals):—
Pods (indeliscent) septate between the seeds:—
Flowers large; petals adnate below to the staminal tube, otherwise free; pod woody turgid, sutures not thickened
Flowers small; petals connate below in a tube and
spongy or fleshy hardly turgid, the sutures thickened 67. Enterologium.
- and not not not week the seeds :-
Pods straight with thin valves:— Sutures thickened; valves elastically revolutely dehiscent from apex to base
Sutures thin, pods indehiscent or if dehiscent the
Pods twisted with coriaceons valves or if almost
straight (P. outatinum) with fleshy valves, (sutures
thin) 70. PITHECOLOBIUM.

# PARKIA R. Br.

Tall, unarmed trees. Leaves bipinnate with usually very numerous leaflets. Flowers in dense long-peduncled heads, each subtended by a coriaceous persistent ligulate bract with a spoon-shaped tip. Calyx tubular, shortly 5-cleft, lobes imbricate. Corolla tubular, cleft half-way down, the segments subvalvate. Stamens 10, exserted, the filiform filaments united in the lower part with each other and with the corollatube; anthers narrow, gland-tipped, the pollen cohering in irregular masses. Ovary stalked, many-ovuled; style filiform, stigma minute capitate. Pod large, flat, strap-shaped, coriaceous, finally dehiscing. Species about 10, cosmopolitan in the tropics, mostly American.

Petioles with two glands; heads subspherical (leaflets very narrow, acute, in 60-100 pairs) 1. P. biglandulosa. Petioles with one gland only; heads turbinate or clavate:-Leaflets subfalcate, acute, in 40-80 pairs 2. P. Roxburghii. Leaflets straight, obtuse or retuse in 20-35 pairs ... 3. P. speciosa.

1. Parkia Biglandulosa W. & A. Prodr. 279. Leaves 2-pinnate, main-rachis downy 12-15 in. long; pinnæ 20-40 pairs A lofty tree. subalternate, secondary rachises also downy about 3 in. long; leaflets small straight narrow linear-ligulate close-set, 60-100 pairs, with obliquely truncate bases and acute apices, strongly 1-nerved, pubescent along the margins, 2 in. long, 05 in. across, petiolar part of main rachis 1-1.5 in. long, with 2 collateral glands at the top of its swollen base, and with 3-9 solitary glands between the bases of as many pairs of pinnæ toward the apex of the rachis. Flowers in dense subspherical heads 1.5 in. in diam., peduncle 4-9 in. long. Calyx tubular, shortly 5-cleft, 3 in. long, teeth pilose, elsewhere glabrous. Corolla tubular, segments subvalvate. Stamens 10, exserted, the filaments connate below and adnate at base to corolla tube; anthers narrow. Pod (including stipe 2 in. long) 14-15 in. long, 1.5 in. wide, 35 in. thick, black, at first downy, ultimately quite glabrous. Seeds 10-12, oval, 75 in. long, 5 in. wide, 25 in. thick, darkbrown, smooth with a central ovate-lanceolate pale-brown rugose area. Bak. in Flor. Brit. Ind. II. 289. Mimosa pedunculata Roxb. Fl. Ind. II, 551.

## MALAY PENINSULA; fide Baker.

Mr. Baker says that this comes from the Malay Peninsula, and on his authority the statement is here repeated. No botanist has, however, hitherto sent it from the Malay Peninsula; the locality given by Roxburgh is not Malaya, but "the islands to the, eastward of the Bay of Bengal;" by this Roxburgh indicates the Andamans and Nicobars. Still, no one has gathered it there in recent years, and the precise habitat must for the present be left doubtful. The specimens at Calcutta are (1) Wight's n. 559, the type of the species; cult. in the Missionary Garden; (2) Specimens from Madras Agri. Hort. Society's Garden collected by Dr. Cleghorn; (3) Specimens of Roxburgh's plant from the Calcutta Botanic Garden where the tree still grows—these last are exactly like Wight n. 559 and show that the doubts expressed by Wight and Arnott as to the indentity of their plant with Roxbugh's Mimosa pedunculata are unfounded; (4) Specimens, no doubt from cultivated examples, sent from Assam by Masters and by Jenkins. This is the only Parkia at all generally cultivated in Bengal; the next species, which is also grown, is comparatively uncommon.

P. biglandulosa should then be carefully looked for in the Nicobars and Andamans, and particularly in N. Andaman; it is highly improbable that it will be found, in a wild state, either in Indo-China or in Malaya.

2. Parkia Roxburghii G. Don, Gen. Syst. II, 397. An erect tree 40-60 feet high, stem about 2 feet in diam., young branches pubescent. Leaves 2-pinnate, main-rachis puberulous or glabrescent, 12-24 in. long; pinnæ 20-30 pairs, opposite; secondary rachises glabrescent 3-6 in. long; leaflets small, falcately curved forwards, linear-lanceolate, closeset, 40-80 pairs, subequally truncate at base, apex acute, strongly 1-nerved, puberulous along the margins, '3 in. long, '1 in. wide, petiolar part of main-rachis 2-3 in. long with 1 solitary gland below the lower pair of pinnæ and with 3-5 solitary glands between the bases of as many pairs of pinnæ towards apex of rachis. Flowers in dense turbi-

nate heads, 1.5 in. long, 1 in. in diam., peduncle 10-16 in. long. Calyx tubular, shortly 5-cleft, 25 in. long, teeth pilose, elsewhere glabrous. Corolla tubular, pale-yellow, segments subvalvate. Stamens 10, exserted, the filaments connate below and adnate to corolla-tube; anthers narrow Pool (including stipe 3-7 in. long) 15-20 in. long, 1.5 in. wide, 3 in. thick, black, glabrous. Seeds 12-20, oval, 5 in. long, 35 in. wide, 2 in. thick, dark-brown and smooth throughout. Bak. Flor. Brit. Ind. II, 289. P. Brunonis Grah. in Wall. Cat. 5288. P. africana Miq. Flor. Ind. Bat. I, 52 not of R. Br. P. biglobosa Benth. in Hook. Journ. IV, 328; Miq. Flor. Ind. Bat. Suppl. 283; Koord. & Val. Bijdr. I, 276. P. intermedia Hassk. Cat. Hort. Bog. 289; Pl. Jav. Rar. 414. Mimosa biglobosa Roxb. Flor. Brit. Ind. II, 551 not of Jacq.

SINGAPORE; cultivated, Ridley 6928! MALACCA; Panchor, Goodenough 1748! DISTRIB. Wild in Silhet, Cachar and Chittagong; cultivated sparingly in Indo-China and Malaya.

Mr. Goodenough gives the native name as "Kada-ong;" the seeds, he notes, are used as peppermint. This species is said by Koorders and Valeton to be wild in Java; the species cultivated by the Javanese is not, however, the present one, but the next, P. speciosa Hassk. And it should be noted besides that the wild tree in Java is not exactly the tree that is wild in Silhet, Cachar and Chittagong but is the form that Hasskarl proposed to treat as a distinct species under the name P. intermedia. Mr. Ridley's specimens, from the Singapore Gardens, are precisely like those from Cachar and Chittagong (true P. Roxburghii); Mr. Goodenough's, on the other had, are absolutely identical with those from Java (true P. intermedia). Before definitely deciding that P. intermedia and P. Roxburghii are the same species, the writer would wish to study the former in the living state; it is often a rash thing to reduce to another, from herbarium material alone, species founded by so competent a botanist as Hasskarl; so far as our Calcutta specimens go, the evidence is altogether in favour of these two trees being quite distinct.

3. Parkia speciosa Hassk. Flora XXV. Beibl. 55. A large tree with spreading branches, 80–100 feet high, stem 2–3 feet in diam., young branches glabrescent. Leares 2-pinnate, main-rachis pubescent, 8–10 in. long; pinnæ 10–16 pairs, subalternate, secondary rachises puberulous, 3 in long; leaflets small almost straight, linear, close-set, 20–35 pairs, subequally truncate at base, obtuse or retuse at apex, ·25 in. long, ·1 in wide, with strong median and 3–4 pairs of distinct secondary nerves beneath, margins with only a few scattered hairs; petiolar part of main-rachis 1–1.5 in. long, with 1 solitary gland midway between base and lowest pair of leaflets and with 2–6 solitary glands between the bases of as many pairs of pinnæ towards apex of rachis. Flowers in dense narrowly clavate heads, 2 in. long, ·75 in. in diam., peduncles slender 16–20 in. long. Calyæ tubular, shortly 5-cleft, ·25 in. long, teeth pilose, elsewhere glabrous. Oorolla tubular, white, segments subvalvate. Stamens 10, exserted, the filaments connate below and adnate to corolla-tube; anthers

narrow. Pod (including stalk 2-5 in. long) 18-20 in. long, 2-2.5 in. wide, 3 in. thick, black, glabrous. Seeds 12-18, oblong-oval, 9 in. long, 6 in. wide, 25 in. thick, dark-brown and smooth throughout. Hassk. Cat. Hort. Bog. 289; Pl. Jav. Rar. 414; Miq. Flor. Ind. Bat. I, 53. P. macrocarpa Miq. Flor. Ind. Bat. Suppl. 284. Acacia graveolens Jack, Mal. Misc. II, 78. The Pete or Pethek.

Penang; on the coast, cultivated, *Curtis!* Prov. Wellesley; *Kunstler* 1657! Perak; Thaiping, *Scortechini* 504! Larut, in dense jungle from 500-2000 feet elev., local, *Kunstler* 5300! Distrib. Sumatra; Java, (cult. *Hasskarl!*).

It would appear that this is the only species of Parkia truly wild in our area. It has been identified by Father Scortechini with P. macrocarpa Miq., from Sumatra, of which there is no authentic specimen at Calcutta; it certainly accords admirably with Miquel's description. There is at Calcutta an authentic example of Hasskarl's P. speciosa; it proves that the present species is no other than Hasskarl's plant, and as Hasskarl's name has nearly twenty years' priority it is here adopted. In the Index Kewensis it is suggested that both P. intermedia and P. speciosa may be forms of P. Rozburghii. To judge by Hasskarl's description this may be true of P. intermedia; as regards P. speciosa the suggestion is obviously an impossible one.

While however, Hasskarl's name P. speciosa is long anterior to Miquel's, it does not conserve the oldest specific name. This tree is, as Hasskarl expressly admits, (Neuer Schluess. 50) the Pete of Rumphius (Herb. Amb. III, 51); it is equally the Petek of Jack, to which Jack has given the name Acacia graveolens. The writer does not propose, in the modern manner, to suggest that P. speciosa should therefore be known as Parkia graveolens, though doubtless there are those who will seize the opportunity of applying this name and of posing as authorities for the species.

It is strange that though evidently wild so near as in Sumatra and in the Malay Peninsula, this species is only cultivated in Java, and that there, according to Koorders and Valeton, its native country is unknown. These authors indeed (Bijdr. I, 268) suggest that it is a native of British India. It certainly is not a native of India proper; it is not even cultivated there. Our Indian species are, P. Roxburghii (P. biglobosa), wild in Silhet, Cachar and Chittagong; P. leiophylla, wild in Pegu; and P. insignis, wild in Martaban. We in India also experience a difficulty like that experienced by our Dutch colleagues, since there is a species P. biglandulosa, cultivated in India from Madras to Assam, of whose natural habitat we are somewhat uncertain.

## 59. Entada Adans.

Woody unarmed climbers, with tendrils. Leaves bipinnate. Flowers in long narrow spikes, minute, yellowish, polygamous. Calyx minute, campanulate, equally 5-toothed. Corolla oblong in bud, the 5 long equal narrow lobes falcate in expansion. Stamens 10, free, shortly exserted, filaments filiform; anthers crowned with a gland. Ovary subsessile, many-ovuled; style filiform, stigma concave terminal. Pod flat, woody, very large, composed of many discoid one-seeded joints,

the endocarp persisting round the large compressed orbicular seeds, Species 10, the others Trop. African and American.

ENTADA SCANDENS Benth. in Hook. Journ. Bot. IV. 332. A very large slender creeper; branches woody terete glabrous. Leaves with petiole 2-4 in. long, the rachis as long or longer ending usually in a tendril; piunæ usually 4 with stalks 1.5-2.5 in. long, leaflets oblong or obovate, obtuse or acute, 1-2 in. long, 6-125 in. wide, glabrous, darkgreen, rigidly coriaceous, shining above; petiolules 1 in. Inflorescence of peduncled spikes, 6-10 in. long, usually panicled from the nodes of old leafless branches, sometimes simple from the axils of the leaves. Flowers 1-15 in. long, sessile or very shortly pedicellate. Calya green, 5-toothed, teeth valvate. Corolla yellow. Pod 1-3 feet long, 3-4 in. wide, 1.5 in. thick, slightly curved, sutures very thick indented between seeds, valves woody depressed sublineate between the seeds, with a tendency to segmentation. Seeds 5-15, oblong, somewhat flattened, 2 in, long, 2.25 in. wide, 1.25 in. thick, testa very dark-brown, thick tough polished, slightly oily. Brand. For. Flor. 167; Bak. in Flor. Brit. Ind. II, 287. E. Pursætha DC. Prodr. II, 425; Wall. Cat. 5294; W. & A. Prodr. 267; Miq. Flor. Ind. Bat. I, 45; Scheff. in Nat. Tijds. Ned. Ind. XXXII. 412 t. 16, t. 18A. E. monostachya DC. Prodr. II, 425; Wall. Cat. 5293. E. Rheedei Spreng. Syst. II, 325. E. Parrana Spreng. Syst. II, 325. E. Rumphii Scheff. Nat. Tijds. Ned. Ind. XXXII, 412 t. 17, t. 18B. Mimosa scandens Linn. Sp. Pl. ed. II. 1501; Roxb. Flor. Ind. 554. Rumph. Herb. Amboin. V. 5. t. 4; Rheede, Hort. Malab. VIII. t. 32, 33, 34; IX, t. 77.

Andamans; very common on the coasts. NICOBARS: Kurz! Coco GROUP; Prain! NARCONDAM; Prain! PENANG; Porter (Wall. Cat. 5293)! Curtis 115! MALACCA; Hervey! Derry! PERAK; Scortechini 769! Kunstler 1018! 6228! Wray 1676! 1715! 2866! DISTRIB. Tropics generally.

Rather variable as to number and size of leaflets; both the forms figured by Scheffer occur in our area. That which he terms E. Rumphii is much the commoner in the Malay Peninsula: from the Andamans and Nicobars only the form E. Pursætha is reported.

#### 60. ADENANTHERA Linn.

Erect trees without spines or tendrils. Leaves ample, bipinnate. Flowers minute, in narrow spike-like racemes, hermaphrodite, usually pentamerous. Calya campanulate, equally toothed. Petals valvate, equal, lanceolate, cohering only at the very base. Stamens 10, free, equalling the corolla; anthers tipped with a gland. Ovary sessile, many-ovuled; style filiform, stigma minute capitate. Pod strap-shaped, torulose, falcate, the coriaceous valves much twisted after they separate.

Seeds small, bright-coloured. Species 4, spread through tropics of Old World.

Leaflets obtuse glabrous beneath; pinnæ 8-12 ... 1. A. pavonina.

Leaflets acute puberulous beneath; pinnæ 6-8 ... 2. A. bicolor.

1. ADENANTHERA PAVONINA Linn. Sp. Pl. 384. A small unarmed tree 20-50 feet high. Leaves with a petiole 2-4 in. long, rachis prolonged 6-10 in. not produced beyond last pair of pinnæ; pinnæ 8-12 opposite, 3-6 in. long with stalk 5-75 in. long; leaflets alternate 10-16, ovate or oblong, base wide-cuneate, apex obtuse, papery, 5-1.5 in. long, ·3-·75 in. wide, dark-green above, pale glaucous beneath, glabrous on both surfaces; petiolule 15 in. long. Inflorescence of narrow shortpeduncled racemes 2-6 in. long, axillary or panicled at the ends of branches. Flowers small, '15 in. long, on slender pedicels also '15 in. long. Calyx green, lobes very small. Corolla pale-yellow, the petals equal, valvate, narrow-lanceolate, free except at the base, glabrous. Stamens 10, free, hardly exserted, anthers tipped by a gland. Pod flat, 6-9 in. long, 6 in. wide, 3 in. thick, contorted when ripe. Seeds 10-15, lenticular, 35 in. in diam., 25 in. thick, with a smooth, shining, usually . uniformly red testa. DC. Prodr. II, 446; Roxb. Flor. Ind. II, 370; Wall. Cat. 5300; W. & A. Prodr. 271; Wight, Ill. t. 80; Bedd. Fl. Sylvat. t. 46; Miq. Flor. Ind. Bat. I, 46; Bak. in Flor. Brit. Ind. II, 287.

Andamans; very common. Perak; Thaiping, Scortechini 80! Inatang Jambu, Wray 2515! Kedah; Langkawi, Curtis! Tongkah; Curtis' Collector 3091! Malacca; Griffith! Distrib. Widespread in South-Eastern Asia.

2. ADENANTHERA BICOLOR Moon, Cat. Pl. Ceyl. 34. A small slender unarmed tree 20-30 feet high. Leaves with a petiole 1.5-2.5 in. long, rachis prolonged 3-5 in., not produced beyond last pair of pinnæ; pinnæ 6-8 opposite, 2.5-4 in. long with stalk 3 in. long; leaflets alternate 8-10, ovate or elliptic, base rounded, apex acute, rigidly subcoriaceous, '75-1'5 in. long, '5-'75 in. wide, bright-green glabrous above, paleglaucous adpressed-puberulous beneath; petiolule 15 in. long. Inflorescence of narrow short-peduncled racemes 3-5 in. long, axillary or panicled at the ends of branches. Flowers small, 15 in. long, on slender pedicels also 15 in. long. Calyx green, lobes very small. Corolla white, the petals equal, valvate, elliptic-lanceolate, free except at the very base, glabrous. Stamens 10, free, distinctly shortly exserted, anthers tipped by a stipitate gland. Ovary glabrous reddish. Pod flat, 4-6 in long, ·6 in. wide, ·3 in. thick, contorted when ripe. Seeds 8-10, lenticular, 35 in. in diam., 25 in. thick, with a smooth shining red, or black and red testa. Thwaites Enum. Pl. Zeyl. 98; Bedd. Flor. Sylvat. 94; Bak. in Flor. Brit. Ind. II, 287.

Penang; Waterfall, Curtis 2840! King! Perak; Larut, Kunstler 3991! Scortechini 197! 1849! Assam Kumbong Wray 2124! Pankore; Scortechini 1073! Singapore; Bukit Timah, Hullett 880! Bukit Mandai, Ridley 3636 A! Malacca; Miller! Griffith! Maingay 591! Derry 522!

The seeds are not always black and red but are sometimes concolorous red just as is usual in A. pavonina. The nearest ally of this species is one obtained in Borneo by Mr. Hullett. This Mr. Hullett notes as "a good-sized tree," from Sarawak (Hullett 292); Mr. Brace in the Calcutta Herbarium has named it A. borneensis Brace. The diagnosis between the two species may be given as follows:—

Pinnæ 3-4 pairs; leaflets 8-10, acute at apex, always under 2 in. long, 1.5 times as long as broad, pale-green above, glaucous and puberulous beneath; flowers not longer than pedicels ... ... ... ... ...

Piunæ 2 pairs; leaflets 4-5, acuminate at apex, usually over 2 in. long, twice as long as broad, dark-green above, glabrous

and not glaucous beneath; flowers twice as long as pedicels... 2. A. borneensis.

The flowers of A. borneensis are considerably larger than those of A. bicolor.

A. bicolor.

Dr. Griffith has noted that the Malay name of A. bicolor in Malacca is "Bunah Saga;" Mr. Derry gives it as "Saga."

# 61. NEPTUNIA Lour.

Herbs without prickles. Leaves bipinnate, with persistent stipules and numerous small strap-shaped sensitive membranous leaflets. Flowers minute, dimorphous, in dense heads on axillary peduncles, polygamous, those of the lower part of the head bearing only protruded flattened staminodia. Calyx minute, campanulate, 5-toothed. Petals 5, strapshaped, connate near the base. Stamens of the perfect flowers exserted; anthers gland-crested. Ovary stalked, many-ovuled; style filiform, stigma club-shaped. Pod coriaceous, flattened, ligulate or oblong, 2-valved. Species 8; cosmopolitan in the tropics.

NEPTUNIA OLERACEA Lour. Fl. Cochinch. 654. An unarmed herb with annual wide-creeping softish swellen stems, rarely emitting suberect branches, rooting copiously at the leaf and flower-bearing nodes. Leaves 2-pinnate, rachis (including petiole 1.5 in.) 2.5-3 in. long, glabrous; pinnæ 4-6, 2-3 in. long, with stalk 3 in. long; leaflets 8-15-ingate, narrow-oblong, obtuse, glabrous, 35-5 in. long, 2 in. wide. Peduncles ascending 3-12 in. long, glabrous; flowers minute, in dense heads 5-75 in. long, 5 in. across, the lower replaced by numerous ligulate yellow staminodes 25-3 in. long, bracts small ovate subobtuse. Corolla 05 in. long. Pod oblong, oblique, 5-1 in. long, 35 in. wide, beaked, dry, dehiscing early by the upper suture. Seeds 6-9, transverse, narrow-oval, somewhat pointed towards hilum, obtuse at opposite end, 2 in. long, 12 in. wide, 1 in. thick, testa brown, polished. Benth. in Hook, Journ. IV, 354; Miq. Flor. Ind. Bat. I, 50; Bak. in. Flor. Brit. Ind.

II, 285. Mimosa natans Roxb. Cor. Pl. t. 119; Hort. Beng. 40; Fl. Ind. 553. Desmanthus natans Willd. Sp. Pl. IV, 1044; DC. Prodr. II, 444; Wall. Cat. 5295; W. & A. Prodr. 270. D. lacustris DC. Prodr. II, 444. D. stolonifer DC. Prodr. II, 444.

PENANG; Bagian Jumal, Gurtis! PROV. WELLESLEY; Butterworth, King!

## 62. XYLIA Benth.

Tall unarmed tree. Leaves bipinnate. Flowers in round heads, mostly perfect. Calyx tubular, 5-toothed at the tip. Petals 5, valvate, slightly united at the base, little longer than the calyx. Stamens 10, free, exserted; anthers gland-crested in an early stage. Ovary sessile, many-ovuled; style filiform, stigma minute terminal. Pod large, woody, oblong-falcate, finally dehiscing, flat, septate between the oblong compressed seeds.—A single species.

XYLIA DOLABRIFORMIS Benth. in Hook. Journ. Bot. IV, 417. tree 80-100 feet high, unarmed. Leaves 2-pinnate; pinnæ two, terminal on a rachis or petiole 1-2 in. long; leaflets 2-4 pairs, diminishing downward and with below the last pair on the outside a small unopposed leaflet; rachis of pinnæ 3-4 in. long with a gland on the upper side between the bases of each pair of leaflets; terminal leaflets 3-6 in. long, 1.25-2.5 in. wide, lowest pair 1.25-1.5 in. long; all oblong with acute apex and rounded base, subcoriaceous, glabrous on both surfaces; petiolule 1 in. long. Inflorescence of very dense globose heads \*5-75 in. in diam.; peduncles puberulous 3 in. long, slender, thickening in fruit, crowded on short puberulous branchlets developed with the young leaves. Calyx tubular 2 in. long; teeth 5, valvate. Corolla cream-coloured, 25 in. long, petals slightly cuneate at base, valvate, lanceolate. Stamens 10, filaments free, exserted, 5 in. long, young anthers very minutely gland-crested. Ovary sessile, many-ovuled. Pods large woody, oblong-falcate, flat, ultimately dehiscent, 4-6 in. long. 1-2.5 in. wide. 35 in. thick, septate between the seeds. Seeds 6-10. broadly ovate, much compressed, '65 in. long, '5 in. wide, '1 in. thick; testa brown, shining, smooth. Bedd. Fl. Sylvat. t. 186; Miq. Flor. Ind. Bat. I, 42; Bak. in Flor. Brit. Ind. II, 286. Mimosa xylocarpa Roxb. Cor. Pl. t. 100; Hort. Beng. 40; Fl. Ind. II, 543. Inga xylocarpa DC. Prodr. II, 439; Wall. Cat. 5277; W. & A. Prodr. 269. I. lignosa Grah. in Wall, Cat. 5278. I. dolabriformis Grah. in Wall, Cat. 5279.

SINGAPORE; Wallich 5279. DISTRIB. India, Indo-China, Philippines.

## 63. LEUCENA Benth.

Unarmed erect trees. Leaves bipinnate. Flowers sessile, in dense globose heads, 5-merous, usually perfect. Calyx cylindrical-campanulate

shortly-toothed. Petals valvate, free. Stamens 10, free, much exserted; anthers not gland-crested. Ovary stalked, many-ovuled; style filiform. stigma minute terminal. Pod flat, coriaceous, strap-shaped, dehiscent, Species 8, mostly American.

LEUCENA GLAUCA Benth. in Hook. Journ. Bot. IV, 416. A low erect tree or large shrub, 6-20 feet high, without spines. Leaves 2-pinnate 4-6 in. long, petiole about 2-3 in.; pinnæ 4-8-jugate, 2-3 in. long, stalk 35 in. long; leaflets 10-15 pairs, linear-oblong, apex acute, base slightly obliquely cuneate, glaucous, membranous, caducous, finely downy, 4-5 in. long, 1-15 in. wide. Inflorescence of very dense globose heads, 5-75 in. in diam.; peduncles often geminate 1-1.25 in. long, slender, in fruit often about 2 in. long and slightly thickened. Flowers 5-merous, usually all perfect. Calyx cylindric-campanulate, teeth short valvate. Corolla white, ·15 in. long, petals free, valvate. Stamens 10, exserted, 25 in. long, authors without glands. Ovary stalked, many-ovuled, softly sparsely pubescent; style filiform, stigma small terminal. Pod straight, flat, coriaceous, ligulate, dehiscent; 5-6 in. long, 4-5 in. wide; stalk 25-5 in. long. Seeds 15-20, transverse, narrow-ovate, compressed, apex obtuse, base cuneate, 3 in. long, 15 in. wide, under 1 in. thick, testa brown, shining. Miq. Flor. Ind. Bat. I, 41; Bak. in Flor. Brit. Ind. II, 290. Acacia frondosa Willd. Sp. Pl. IV, 1076; DC. Prodr. II, 468; W. & A. Prodr. 276. A. glauca Willd. Sp. Pl. IV, 1075; DC. Prodr. II, 467. A. biceps Willd. Sp. Pl. IV, 1075; DC. Prodr. II, 467. A. leucocephala Link. Enum. II, 444; DC. Prodr. II, 467.

KEDAH; in open jungle, Kunstler 1703! PERAK; Lime-stone Hill, Gapis, Scortechini 912! SELANGOR; on hilly ground, Kunstler 1130! PAHANG; Pulo Tawai, Ridley 2642! PENANG; Water-fall, etc. Curtis 49! SINGAPORE; Maingay 583! DISTRIB. Now cosmopolitan in the tropics but probably originally American.

# 64. MIMOSA Linn.

Shrubs or herbs, with or without prickles. Leaves (in the Malayan species) bipinnate; leaflets small, sensitive, ligulate, caducous. Flowers minute, in dense globose heads, polygamous, (in the Indian species) mostly tetramerous. Calyx campanulate, shortly toothed. Petals connate towards the base. Stamens as many as, or twice the number of, the petals, much exserted, filaments filiform, free; anthers not gland-crested. Ovary stalked, many-ovuled; style filiform, stigma minute terminal. Pod flat, membranous, made up of 1-seeded joints that separate, when mature, from the sutures. Species 230, mostly confined to Trop. America.

Stamens 4; rachis of leaf bristly, stem bristly and prickly, leaves digitately divided, sutures of pod prickly ... 1. M. pudica.

Stamens 8-10; rachis of leaf smooth, stem prickly not bristly, leaves pinnately divided, sutures of pod not prickly ... 2. M. sepiaria.

MIMOSA PUDICA Linn. Sp. Pl. 518. A diffusely spreading undershrub rarely over 2 feet high, with stems and branchlets sparsely prickly and copiously beset with deflexed bristles. Leaves very sensitive, with usually 4 digitate pinne, sessile at the end of a petiole 2 in. or more long, beset with spreading bristles; stipules lanceolate 35 in. long, striate, subscarious, with margius beset with spreading bristles; pinnæ 2:5-3:5 in. long, the rachis beset with ascending bristles; leaflets 12-20 pairs, glabrous above, sparsely adpressed-bristly beneath, subcoriaceous, narrow-oblong, obliquely acute at apex of upper angle, obliquely rounded at lower side of sub-5-nerved base, main-nerve branching slightly upwards, 35 in. long, 15 in. wide; sessile. Inflorescence capitate, the heads usually in pairs from axils all along the branches, ·35 in. in diam.; peduncles very slender ·75-1 in. long, beset with spreading prickles. Calyx campanulate, teeth short valvate. Corolla pink, 1 in. long, petals connate below valvate above. Stamens 4, much exserted, filaments 3 in. long, filiform, free, anthers without glands. Ovary stalked; style filiform, stigma very small terminal. Pods flat, slightly recurved, membranous, '6-1 in. long, '2 in. across, made up of 3-5 I-seeded joints that full away when mature from the persistent armed sutures, which are clothed with weak spreading yellowish-white bristles 15-2 in, long. DC. Prodr. II, 426; Roxb. Hort. Beng. 41; Wall. Cat. 5292; Roxb. Flor. Ind. II, 564; Mig. Flor. Ind. Bat. I, 43; Bak. in Flor. Brit. Ind. II, 291. The SENSITIVE PLANT.

Andamans; extremely common throughout the settlement. Penang; overspreading the whole coast-line, Curtis 1237! Singapore; T. Anderson 32! Maingay 584! DISTRIB. Throughout S.-E. Asia, probably originally introduced from America.

This, having been introduced into the settlement at Port Blair in the Andamans, has there spread so much as to have become extremely troublesome; a large labour force has to be constantly told off to try and keep it in check; its complete eradication is apparently hopeless.

2. Mimosa sepiaria Benth, in Hook. Journ. Bot. IV, 395. A woody shrub with pubernlous branchlets soon glabrescent, sparingly armed with strong compressed slightly recurved prickles. Leaves 2-pinnate, rachis slightly downy 2 in. long (the petiolar part '75 in long); pinnæ 6-8-jugate, 1.5 in. long, subsessile, upper side pubescent; leaflets 12-20-jugate, rigidly coriaceous, narrow-ligulate, caducous, '25-'35 in. long, '1-'15 in. wide, subacute at apex, obliquely truncate at lower side of sub-5-nerved sessile base, main-nerve branching considerably upwards. Inflorescence capitate, the heads '25 in. in diam., arranged in

ample patent terminal panicles with puberulous main-rachis and compound puberulous lower branches; the whole 6-8 in. long, 4-6 in. wide, peduncles of individual heads 5-75 in. long. Calyx campanulate, teeth short, valvate. Corolla 05 in. long. Stamens 8-10, filaments free, 1 in. long. Ovary stalked; style filiform, stigma small terminal. Pod with a slender stalk 2 in. long, flat, almost straight, membranous, 1.5-2 in. long, 25 in. wide, made up of 6-8 glossy, finely reticulated 1-seeded joints that fall away when mature from the persistent unarmed sutures. Bak. in Flor. Brit. Ind. II, 291. M. nigrescens Maingay MSS.

SINGAPORE; Maingay 582! Anderson 34! Kurz! King! DISTRIB. Occurs also in China and in Borneo, but no doubt is an introduction from America; it is only found near clearings.

# 65. ACACIA Willd.

Spinose or prickly shrubs or trees, erect or climbing. Leaves bipinnate, with minute leaflets. Flowers in globose heads or cylindrical spikes, hermaphrodite or polygamous, usually pentamerous. Calyx campanulate or funnel-shaped, shortly toothed. Petals exserted, united in the lower half. Stamens free, indefinite, much exserted; anthers minute, not gland-crested. Ovary stalked or sessile, many-ovuled; style filiform, stigma minute capitate. Pod ligulate or oblong, not jointed, usually compressed and dry, dehiscent or indehiscent, rarely turgid or subcylindrical, sutures straight or wavy, not thickened. Species 430; the leafy groups cosmopolitan in the tropics, the great phyllodineous series, which comprises two-thirds of the genus, almost restricted to Australia. None of the species with spicate inflorescence occur within our area.

Erect shrubs or small trees, with stipular spines, bracteate pedicels and cylindric pods ... ... 1. A. Farnesiana. Climbing shrubs, with non-spinescent stipules, and with prickly branches; pedicels naked: pods flat:—

Flower heads 4 in. across; leaflets narrow oblong ... 2. A. pseudo-Intsia.

Flower heads 2 in. across; leaflets linear ... 3. A pennata

1. Acadia Farnesiana Willd. Sp. Pl. IV, 1083. A shrub or low tree with slender zig-zag branches marked with grey dots. Leaves 2-pinnate; rachis downy 1-1.5 in, long with a minute petiolar gland; pinnæ 8-16, 1-1.5 in, long; leaflets 10-20 pairs, green, subglabrous, rigidly coriaceous, linear-oblong, 25 in, long, 05 in, wide; stipules spinescent seldom over 25-35 in, long on the branchlets, persisting and on old branches sometimes over 1 in, long, polished, white, straight. Flowers in rounded heads 35 in, in diam., fragrant, bright yellow; peduncles crowded on axillary nodes, slender, puberulous, 75-1 in, long, with a ring of small bracts at or near the apex. Calya campanulate, minute.

Corolla 05 in. long, teeth short obtuse. Pod thick cylindric glabrous, 2-3 in. long, 5 in. thick, dull-brown marked with fine horizontal striæ; mesocarp pulpy enclosing the biseriate seeds. Seeds 12-18, ovate, 3 in. long, 2 in. wide, 15 in. thick, smooth, dull-brown with faint lateral areola. DC. Prodr. II, 461; Wall. Cat. 5264 A-F; Bedd. Flor. Sylvat. t. 52; Miq. Flor. Ind. Bat. I, 7; Bak. in Flor. Brit. Ind. II, 292. Mimosa Farnesiana Linn. Sp. Pl. 521; Roxb. Hort. Beng. 40; Flor. Ind. II, 557. Vachellia Farnesiana W. & A. Prodr. 272; Wight, Ic. t. 300. Acacia indica Desv. Journ. Bot. I, 69; DC. Prodr. II, 462. Farnesia odora Gaspar. Desc. Nuov. Gen. Legum. (1838) with plate.

Planted in some of the provinces:—Andamans; Kurz! Penang; Porter (Wall. Cat. 5264F)! Pahang; Kutapong, Ridley 1246! Distrib. Cosmopolitan (perhaps usually planted) in the tropics.

2. Acada pseudo-Intsia Miq. Flor. Ind. Bat. I, 12. A large scandent shrub 12-20 feet high, the branches and branchets armed with many small sharp recurved glossy dark-coloured prickles; young branches blackish, puberulous or glabrescent. Leaves 2-pinnate, rachis 8 in. long, puberulous or glabrescent, strongly armed with recurved prickles beneath, petiolar portion 2.5 in. long with a large projecting gland close to base on its upper surface; pinnæ 8-12-pairs, 2.5-3.5 in. long, the upper 2-4 pairs with glands between their bases; leaflets 30-35 pairs, sessile, linear-oblong, obtuse, 4 in. long, 15 in. wide, rigidly subcoriaceous, glabrous above, adpressed-puberulous or glabrous beneath. Flowers in rounded heads, 4 in. in diam., yellow, peduncles 5-75 in. long, slender, puberulous, naked, in clusters of 2-4, rarely solitary along a panicle extending 10-12 in. beyond the leaves; bracts large, ovate-acute or acuminaté, 2-25 in. long. Calyx puberulous, 07 in. long. Corolla 1 in. long. Pod not seen.

Var. typica; bracts puberulous, pedicels 5 in. long, leaflets adpressed-puberulous beneath.

SINGAPORE; Changhi, Hullett 835! Ridley 3631! Bukit Timah, Ridley 6177! DISTRIB. Sumatra, Java.

VAR. ambigua Prain; bracts glabrous, pedicels '75 in. long, leaflets quite glabrous beneath.

Andamans; very common, King's Collectors!

In externals the Singapore plant much resembles A. caesia W. & A., the Andamans one at the same time resembling A. Intsia Willd. except in having the leaflets crowded. Closer examination shows, however, that the natural alliance of the species is rather with the group of forms aggregated under the name A. pennata; the large bracts, in particular, make all further comparison with the group to which A. Intsia belongs an impossibility.

Its nearest ally is a species from Northern Indo-China described by Kurz under the name A. pruinesceus from which this differs in having broader leaflets, in

having no bloom on the young branches, and particularly in having the large petiolar gland very near the base of the petiole; the corresponding gland in A. pruinescens is about an inch above the base. The two species A. pseudo-Inteja and A. pruinescens taken together form a group that is almost exactly intermediate between the A. Intsia and the A. pennata groups.

ACACIA PENNATA Willd.; Bak. in Flor. Brit. Ind. II, 297. A large scandent bush or strong creeper, sometimes extending for 50-60 feet, branches and branchlets armed with many small sharp slightly recurved glossy brown or blackish prickles, young twigs faintly pubescent or glabrous. Leaves 2-pinnate; the rachis 6 in. long, glabrous or puberulous, prickly beneath or unarmed, petiolar portion '75-1 in. long with a projecting large or small gland 4-5 in. above the base; pinnæ 20-40 pairs, 1 25-2 in. long, the upper pairs with glands between their bases; leaflets 35-40 pairs, sessile, linear, 2-35 in. long, under 05 in. wide, firm, glabrous. Flowers in rounded heads 2 in. in diam., white or pale-yellow, pedaucles 5-7 in. long, slender, puberulous, naked, in clusters of from 4-8 along a panicle extending 12-15 in. beyond the leaves; bracts small linear, 1 in. long. Calyx glabrous, 05 in. long, campanulate. Corolla 07 in. long. Pod linear-oblong, acute or acuminate at both ends, 4-6 in. long, '75-1 in. wide, flat, very thin, with a stalk under 2 in. long, the sutures slightly thickened. Seeds flat, ovate, 4 in. long, 2 in. wide, under 1 in. thick, faintly areolate, dull-brown, smooth.

VAR. arrophula Bak. in Flor. Brit. Ind. Ind. II. 298; leaf-rachis almost glabrous, prickly beneath, peduncles 4-6-nate; petiolar gland large, inter-pinnular glands 2-3. A. arrophula Don. Prodr. Flor. Nep.

Andamans; very common. Distrib. India, Indo-China.

VAR. pluricapitata Bak. in Flor. Brit. Ind. II, 298; leaf-rachis puberulous, not prickly, peduncles 6-8-nate; petiolar gland small, interpinnular glands 10-12. A. pluricapitata Steud. Nomencl. ed. II, 1, 7; Benth. Hook. Lond. Journ. I, 516; Pl. Jungh. I, 267. A. polycephala Grah. in Wall. Cat. 5255 not of DC.

PENANG; Porter (Wall. Cat. 5255)! MALACCA; Griffith! Maingay 585! Derry 166! Holmberg 838! Hervey! Perak; Scortechini! Kunstler 482! 3332! 4876! 5504! 10300! DISTRIB. Malay Archipelago.

Following the Mora of British India these two very distinct plants are here treated as varieties of Acacia pennata. That A. pluricapitata is deserving of specific rank seems almost certain, and it is probably equally certain that the plant here termed VAR. arrophula should also be separated specifically from A pennata. The point can only be satisfactorily settled in a monographic revision of the Indian Acacias; pending the preparation of such a revision it seems better to deal with the forms as they have been dealt with by Mr. Baker. The true A. pennata of Will-250

#### 66. SERIANTHES Benth.

Unarmed trees. Leaves 2-pinnate. Flowers racemose, very large, 5-merous, mostly hermaphrodite. Calya deeply campanulate, deeply toothed. Petals adnate to the base of the staminal column, free above. Stamens monadelphous, very numerous; anthers minute. Ovary sessile, many-ovuled; style filiform, stigma minute capitate. Pod large obloug, almost woody, somewhat turgid, indehiscent, septate between the seeds. Species 2, one in Malaya, one in Polynesia.

SERIANTHES GRANDIFLORA Benth. in Hook. Lond. Journ. Bot. III, 225. A large unarmed tree with rusty-puberulous young branches. Leaves evenly 2-pinnate, rachis puberulous 7-9 in. long, with a large sessile gland 25 in. above base and with small glands between the bases of each pair of pinnæ; pinnæ 3-8-jugate, 3-4 in. long, puberulous; leaflets 6-12 pairs, obliquely oblong, subfalcate, obtuse, base obliquely truncate, 5-1 in. long, 3-6 in. wide, rigidly subcoriaceous, glossy-green above, paler dull reticulate-veined beneath, glabrous on both surfaces. Flowers few, in axillary corymbose panicles 4-6 in. long. main-rachis puberulous, peduncular portion 2 in. long, the branches puberulous 5-7 in. long, each 2-4-fld; pedicels densely tomentose 2 in. long; buds oblong or globose, 35 in. across. Calya wide-campanulate, 5 in. long, 35 in. wide with triangular teeth one-third the length of tube, uniformly densely felted externally. Corolla vellowish-white, 1.5 in. long, the segments densely woolly externally, glabrous within. Filaments over 500, 2.5 in. long. Pod turgid, 6 in. long, 2.25 in. wide, '75 in. thick, epicarp thin brittle, endocarp woody; sutures thin, valves septate and slightly depressed between the seeds. Seeds 6-8, narrowly ovate, the long axis across the pod, '75 in. long, 3 in. across, 15 in. thick, testa dark-brown, smooth but hardly shining, seed faintly areolate. Miq. Flor. Ind. Bat. I, 40; Bak. in. Flor. Brit. Ind. II, 301. Inga Finlaysoniana Wall. Cat. 5284. I. grandiflora Wall. Cat. 5285. I. ventricosa Grah. in Wall. Cat. 5266 in part.

SINGAPORE; Wallich! Finlayson. MALACCA; Griffith! Maingay 580! DISTRIB. Malay Archipelago.

### 67. ENTEROLOBIUM Mart.

Erect unarmed trees. Leaves bipinnate. Flowers in globose heads, 5-merous, usually hermaphrodite. Calyx campanulate or subcampanulate, shortly toothed. Corolla subinfundibuliform, the petals connate to the middle. Stamens monadelphous much exserted; anthers small not gland-crested. Ovary sessile many-ovuled; style filiform, stigma minute capitate. Pod strap-shaped straight or curved, indehiscent, mesocarp spongy at length hardening, or pulpy and soft, endocarp firm

forming continuous septa between the seeds; the sutures thickened. Species 5 or 6, all American; one introduced and now becoming subspontaneous in S.-E. Asia.

ENTEROLOBIUM SAMAN Prain. A large spreading tree 40-60 feet high, stem 3 feet or more thick, branches pubescent. Leaves evenly 2-pinnate. rachis 4-6 in. long, pubescent, basal gland none but with glands between the bases of each pair of pinnæ, single in the upper, paired in the lower half of the rachis; pinne 4-6-jugate, 2-3 in. long, rachises pubescent with glands between each pair of leaflets; leaflets decreasing downwards, 6-8-jugate in the upper, 3-5-jugate in the lower pinnæ, ovateoblong rigidly coriaceous, glabrous above, densely pubescent beneath, apex obtuse, base obliquely truncate, main-nerve diagonal, terminal 1.5 in. long, '8 in. wide; stipules small lanceolate, densly pubescent, deciduous. Flowers in dense heads 1.25 in. across, on pubescent pedicels 2.5 in. long, solitary or 2-3 together in the axils of the upper leaves, each with a lauceolate pubescent bract 15 in. long and a slender puberulous pedicel '05 in. long. Calyx infundibuliform, densely pubescent externally, 15 in. long, teeth wide-triangular, short. Corolla pinkish, infundibuliform, 3 in. long, tube puberulous outside, teeth ovate, externally pubescent, half as long as tube. Filaments pink, 1.25 in. long, connate at base in a tube one-third as long as that of corolla. Pod straight, 6-7 in. long, 6 in. wide, 35 in. thick, valves slightly depressed between the seeds, sutures thickened, epicarp thinly crustaceous, mesocarp pulpy, endocarp firmly crustaceous and forming continous septa between the seeds. Seeds 16-20, transversely ovate, 4 in. long, 25 in. wide, 2 in. thick, testa smooth brown shining with distinct duller darker-brown ovate areola, without arillus. Inga Saman Willd. Sp. Pl. IV, 1024. Pithecolobium Saman Benth. Hook. Lond. Journ. Bot. III, 216. Calliandra Saman Griseb. Fl. W. Ind. 225. The RAIN TREE.

PLANTED in many of the provinces and now appearing subspontaneously, at least in the Andamans and Nicobars. A native of Guiana; introduced in the West Indies whence it has been sent to Asia.

This species, though of much more recent introduction than Pithecolobium dulce, is also of some economic importance, owing to its rapidity of growth and the readiness with which it thrives, as compared with most native species, when used in the re-afforestation of abandoned clearings. The sweet pulpy pods, of which it produces an abundant crop, are greedily eaten by cattle.

When Mr. Bentham tentatively placed the species in *Pithecolobium* he explained that the tree was unknown to him. Dr. Grisebach, who had the advantage of studying the tree in the living state, at once recognised that it cannot possibly be a *Pithecolobium* and placed it in *Calliandra*, no doubt owing to the sutures of its pods being thickened as in that genus. That the pods are septate and indehiscent militates however against his proposal, for the crucial test of a *Calliandra* is that its pods, which may not be septate, shall dehisce clastically from apex to base. The *Index* 

Kewensis has therefore replaced the 'Rain-Tree' in Pithecolobium; this, however, is a step which in turn similarly mars the generic limits of that group since the pods of Pithecolobium must not be septate. The writer places the species with more confidence in Enterolobium owing to its possessing the septate pods characteristic of that genus. The pulpy, in place of spongy at length indurated mesocarp, and the shortly pedicelled in place of sessile florets, cannot, in view of the variability of these characters within adjacent genera, be considered more than comparatively trivial deviations from the hitherto recognised characters of Enterolobium. The writer is unable, both on academic and on practical grounds, to agree with the proposal, made by some botanists, to amalgamate Calliandra, Pithecolobium, Enterolobium and Albizzia.

#### 68. CALLIANDRA Benth.

Shrubs or trees. Leaves bipinnate, with small or large leaflets. Flowers in globose heads, polygamous, 5-merous. Calyx campanulate, toothed. Corolla funnel-shaped, deeply 5-cleft. Stamens indefinite, monadelphous at the base, filaments filiform much exserted; anthers minute, not gland-crested. Ovary stalked, many-ovuled; style filiform, stigma minute capitate. Pod strap-shaped, slightly falcate, flat, rigidly coriaceous, the valves dehiscing with elasticity, bordered by muchthickened sutures, continuous within, narrowed gradually to a short stalk. Species 80, mostly tropical American.

CALLIANDRA UMBROSA Benth. in Gen. Pl. I, 597. A tree 20-25 feet high, with slender glabrous branches and sometimes with small subcrect stipular spines. Leaves 2-pinnate, petiole 1 25 in. long, glabrous; pinnæ 2, terminal, each with rachis 1.25-1.5 in. long, with a pair of large sessile, oblique, oblong, rigidly subcoriaceous end-leaflets, acute at apex, cuneate at base, 6 in. long, 2 in. wide and with an odd similar but much smaller leaflet 1.5-2 in. long, .5-.75 in. wide, on the outer side below; leaflets all glabrous on both sides, rather distinctly nerved beneath and each with a gland on rachis at base. Flowers sessile in small dense globose heads '4 in. across, with minute bracts, on short ascending slender peduncles 4-5 in. long, usually several together from old nodes on the branches; elongating in fruit to 1.5-2 in. Calyx campanulate, teeth valvate. Corolla 12 in. long, yellow, inodorous. Pod 6-9 in. long, .75-1 in. wide, smooth, finely veined, the valves with elevated rounded thickened edges. Seeds 6-9, ovate, 5 in. long, 35 in. wide, long diameter transverse, very much compressed; testa smooth shining thin crustaceous brown. Bak. in Flor. Brit. Ind. II, 302. Inga umbrosa Wall. Pl. As. Rar. t. 124; Cat. 5273. Albizzia umbrosa Benth. in Hook. Lond. Journ. III, 86.

PENANG; fide Baker in Flora of British India.

There are no Malayan specimens at Calcutta; Mr. Baker, however, allades to the existence of Penang examples.

### 69. ALBIZZIA Durazz.

Large trees or, sometimes, (A. myriophylla) shrubs usually climbing. Leaves bipinnate. Flowers (in the Indian species) in globose heads, sessile or pedicellate, usually pentamerous and all hermaphrodite. Calyx campanulate or funnel-shaped, distinctly toothed. Corolla funnel-shaped, petals firmly united below the middle. Stamens indefinite, monadelphous at the base, filaments several times the length of the corolla; anthers minute, not gland-crested. Ovary sessile or shortlystalked; style filiform, stigma capitate minute. Pod large, thin, flat, strap-shaped, straight, indehiscent or subindehiscent, continuous within, the sutures not thickened. DISTRIB. Species 25-30, spread through the Tropics of the Old World.

Shrub, often climbing, the pulvinus below leaf-base enlarging into a firm short recurved hook; the leaflets (numerons) narrowly linear with a median main-nerve Erect usually large trees, pulvinus not accrescent; the leaflets ovate or oblong, or if linear with the main-nerve nearly marginal :-

1. A. myriophylla.

Main-nerve close to upper margin; leaflets (numerous) dimidiate-lanceolate; stipules very large; (flowers shortly pedicellate) Main-nerve removed one-third to one-half the width of leaflet from upper margin; leaflets ovate or oblong; stipules small :--

A. stipulata.

Leaflets never more than 2 in. long, rather numerous:-Glands confined to main-rachis of leaf, leaflets sessile or subsessile :-

Florets pedicellate :-

Pinnæ never more than 4-jugate:-

Umbels small, few-fid., pedicels longer than calvx

Umbels large, many-fld., pedicels not longer than calyx ...

Pinnes 6-12-jugate; indehiscent pod very large and sinuate along the sutures

Florets sessile; main-nerve nearer upper than lower leaf-margin

Glands on the secondary rachises as well as on the main-rachis, leaflets shortly peticlulate; (florets ....

Leaflets few, large; the terminal pairs 4 in. long; (main and secondary rachises both gland-bearing, pinnæ normally 1-jugate) ...

A. littoralis.

4. A. Lebbek.

5. A. pedicelluta.

A. odoratissima.

7. A. procera.

1. ALBIZZIA MYRIOPHYLLA Benth. in Hook. Lond. Journ. Bot. III, 90. An evergreen unarmed shrub or strong climber 15-20 feet long if elimbing, 8-12 ft. high if unsupported, the young shoots shortly tawny-

pubescent, bark thinnish, dark-brown, much lenticelled. Leaves evenly 2-pinnate; rachis 5-9 in. long, densely tawny-pubescent, with a medium sessile gland very near the base and with 2-4 small glands between the bases of as many pairs of distal pinne, stipules subpersistent, subulate, puberulous, 15 in. long, deciduous; pulvinus hardening into a recurved almost woody hook; pinnæ 12-20-jugate, 1-15 in. long, their rachises sparsely pubescent; leaflets 35-50 pairs, crowded. linear, sessile, slightly falcate, apex subacute, base slightly oblique, rigidly chartaceous, 2-25 in. long, '07 in. wide, dark-green and glabrous above, margin ciliolate or glabrous, paler beneath and glabrous or sometimes sparsely adpressed-pubescent; midrib central. Flowers in small 10-20-fid. heads 5 in. across, pale-yellow with greenish-yellow stamens, or white; peduncles slender puberulous, 4-5 in. long, solitary or 2-6 together on nodes in the upper half of pubescent corymbose branchlets 1-1.5 in. long, with pubescent ovate-acute bracts 2 in. long. usually accompanied by 2 subulate stipules like those of the leaves, the branchlets disposed in terminal leafy panicles 4-8 in. long, 2-4 in. · wide: pedicels 0. Calyx campanulate, teeth small, ovate-acute, tube externally densely pubescent, '04 in. long. Corolla infundibuliform. yellowish or white, '15 in. long, teeth ovate-lanceolate one-third the tube and like it uniformly externally softly puberulous. Filaments few, 12-20, united below in a white tube half as long as that of corolla, free portion greenish or white, '4 in. long. Pod dehiscent, 4-5 in. long, ·8-1·2 in. wide, thin, flexible, bright-brown, smooth and shining; opposite the seeds darker and distinctly reticulated. Seeds 6-8, obovate, apex obtuse, base cuneate, '25 in. long, 2 in wide, much compressed, testa dull-brown, smooth, distinctly areolate. Bak. in Flor. Brit. Ind. II, 300. Acacia myriophylla Grah. in Wall. Cat. 5242. A. foliolosa Grah. in Wall. Cat. 5241. Mimosa microphylla Roxb. Fl. Ind. II, 549.

Kedah; Langkawi, Curtis 2135! 2801! Penang; Curtis 718! 1702! - Kunstler 1444! Perak; Scortechini 28! 128!

This does not become a tree. When a climber it has not the assistance, as in climbing Acacias, of prickles; it developes however hard recurved hooks, that help to serve as hold-fasts, from the thickening of the pulvini at the leaf-bases.

2. ALBIZZIA STIPULATA Boiv. Enyel. XIX Siècle II, 33. An unarmed evergreen tree, often 100-120 feet high, young shoots finely greydowny, bark dark-grey rugose, stem 3-4 feet thick; heart-wood darkbrown. Leaves evenly 2-pinnate, rachis 6-18 in. long, pubescent, with a large sessile gland 1 in above the base and with 2-6 small between the bases of as many distal pairs of pinnæ; pinnæ 6-20-jugate, the secondary rachises tawny-pubescent, 25-4 in. long; leaflets 20-45-jugate, dimidiately falcate-lanceolate, sessile, apex acute slightly pointed

forward, base obliquely rounded on lower margin, membranous, 25-3 in, long, 'I in, wide, pale-green glabrous above, glaucous finely downy beneath, the midrib very close to the upper margin; stipules very large. usually 1-1.5 in. long, '4 in wide, obliquely cordate-acuminate, velvetypubescent beneath, puberulous above. Flowers in numerous heads 1.75 in across, yellowish-white, the stamens often more or less flushed with pink: peduncles pubescent 125 in. long, solitary or in fascicles of 2-4 on nodes in the upper half of pubescent racemose branchlets 3-5 in. long, with large pubescent deciduous ovate-acuminate bracts 5 in. long. the branchlets in panicles 8-12 in. long, 6-8 in, wide, at the ends of leafy branches: pedicels 05 in, long, pubescent, Calux 1 in, long, infundibuliform, teeth short acute, densely uniformly pubescent externally. Corolla 2 in. long, teeth lanceolate acute, half as long as tube and like it densely-pubescent outside. Filuments connate at the base in a vellowish tube longer than that of corolla, the free portion of filaments vellowish with a pink flush, or white, 75 in, long. Pod indehiscent 5-6 in. long, 75-1 in. wide, thin, rigid, pale-brown, dull: valves faintly wide-reticulate. Seeds 8-10, ovate, 25 in. long, 2 in. wide, much compressed, testa dark-brown, smooth, dull, not areolate. Benth. in Hook. Lond. Journ. Bot. III, 92; Bedd. Fl. Sylvat. t. 55; Mig. Flor. Ind. Bat. I, 28; Bak. in Flor. Brit. Ind. 11, 300. Acacia stivulata DC. Prodr. II, 469; Wall. Cat. 5326; W. & A. Prodr. 274. A. Smithiana Wall. Cat. 5237. A. marginata Ham. in Wall. Cat. 5243. Mimosa Smithiana Roxb. Hort. Beng. 40; Fl. Ind. II, 550. M. stipulata Roxb. Hort. Beng. 40. M. stipulacea Roxb. Fl. Ind. II, 549. Arthrosprion stipulatum Hassk. Retzia I, 212. The WHITE SIRIS.

Andamans; rare, E. H. Man! NICOBARS; Kamorta, common, Kurz! Distrib. Throughout South-Eastern Asia.

This was once found by Mr. Man in the forests of South Andaman many years ago; none of the numerous collections made in the group during recent years contain any specimens of the species. It becomes quite common again in the Nicobars and in the Malay Archipelago it seems to be as plentiful as it is in India and Indo-China. But from the intervening Malay Peninsula no collector has ever sent a specimen to Calcutta.

Miquel describes three varieties:-

(a.) typica with greenish stamens.

(8.) vegeta with pinkish stamens.

(γ.) stipulis persistentibus with permanent, more pubescent stipules.

But his varieties (3.) and (7.) are only forms of one tree and that tree is what constitutes in reality typical A. stipulata. What Miquel treats as VAR. typica is Roxburgh's Mimosa Smithiana, which has small stipules, and is, if not a distinct species, certainly a very good variety. The Andamans and Nicobars tree is true A. stipulata; the other form has not been met with in our area.

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ALBIZZIA LITTORALIS Teysm. & Binnend., Nat. Tijds. Ned. Ind. XXIX, 259. An unarmed tree 30-40 feet high, young branches glabrous, lenticelled; with ash-grey bark. Leaves evenly 2-pinnate; rachis glabrous, 4-8 in. long, with a large sessile gland near base; pinnæ 2-4-jugate, the distal pair 4-5 in. long with leaflets 5-6-jugate, the proximal 3-4 in. long, leaflets 3-4-jugate; leaflets elliptic-oblong or obovate. obtuse or retuse, base obliquely rounded, or rounded on lower cuneate on upper margin, subsessile, submembranous, glabrous pale-green above, faintly puberulous glaucescent beneath, 75-1.25 in long, 4-75 in. wide. Flowers in small few-fld. umbels, under 5 in across, white with pink stamens; peduncles slender the longest 1.5 in. long, glabrous or puberulous, corymbosely arranged on leafless brauchlets 1-3 in. long, themselves disposed in a terminal corymbose panicle; pedicels 2-25 in. long, very slender, glabrous. Calyx 1 in. long, teeth obscure, tube pubescent. Corolla 2 in. long, teeth ovate-lanceolate, externally closely grey-silky as is the tube. Filaments connate at base in a uniform white tube shorter than corolla, the free portion of filaments pink. Pod 6-7 in. long, 1 in. wide, linear, tapering at both ends, flat, much compressed, glossy pale greenishbrown, uniformly wide-reticulate. Seeds 12-16, transversely oval, much compressed, 4 in. long, 2 in. wide, 1 in. thick, testa smooth brown. Kurz, Journ. As. Soc. Beng. XIV, 2, 129.

NICOBARS; Nancowry, Jelinek! King's Collector! Great Nicobar, Jelinek. Penang; Pulo Jungah, Curtis! Distrib. Malay Archipelago.

The Nicobarese name is "Unjiha;" the name in the Moluccas is "Kellor-laut.".

ALBIZZIA LEBBEK Benth. in Hook. Lond. Journ Bot. III, 87. An unarmed deciduous tree 40-70 feet high, young shoots puberulous or almost glabrous; with pale bark. Leaves evenly 2-pinnate; rachis 3-9 in. long with a large sessile gland near base; pinnæ 2-3- (less often 4-, rarely 1-) jugate, 4 in. long with a gland on the main-rachis above between the bases of the distal, sometimes of the 2 distal pinnæ; leaflets 5-9-jugate, often with glands between their bases, elliptic-oblong or the upper more oblique and obovate-oblong, very obtuse or retuse, base obliquely rounded, or rounded on lower, cuneate on upper margin, subsessile, glabrous above, glabrous or faintly pubescent beneath, reticulate, pale-green, 1-2 in. long, 5-75 in. wide. Flowers in globular subcapitate umbels 1.25 in. across, white and fragrant; peduncles 2-4 in. long, glabrous or puberulous, solitary or 2-4 together from axils of upper leaves, or corymbose at the ends of short leafless branches; pedicels ·1-15 in. long, slender, puberulous. Calyx ·15-2 in. long, teeth short deltoid, tube glabrous or puberulous. Corolla 3 in. long, tube glabrous. the teeth ovate-lanceolate, externally pubescent. Filaments connate at base in a uniform tube shorter than corolla. Pod 4-12 in. long, 1-2 in.

broad; linear-oblong, blunt at both ends, flat, much compressed, with slightly thickened sutures, smooth, glossy, pale straw-coloured except opposite the seeds, there reticulated, pale-brown. Seeds 4-12, transversely oval, much compressed, '6 in. long, '3 in. wide, '1 in. thick, testa smooth, pale-brown. Bedd. Fl. Sylvat. t. 53; Bak. in Flor. Brit. Ind. II, 298. Albizzia latifolia Boiv. Eneye. II, 33; Miq. Flor. Ind. Bat. I, 22. Acacia Lebbek Willd. Sp. Pl. IV, 1066; DC. Prodr. II, 466. Acacia speciosa Willd. Sp. Pl. IV, 1066; DC. Prodr. II, 467; W. & A. Prodr. 275. Acacia Sirissa Ham. in Wall. Cat. 5265. Mimosa speciosa Jacq. Ic. t. 108. M. Sirissa Roxb. Hort. Beng. 40; Flor. Ind. II, 544. The Siris.

Planted in some of the provinces:—Andamans; Kurz! Penang; Curtis 296! Distrib. Planted throughout the tropics; appears to be wild in the drier regions of Asia and Africa.

5. ALBIZZIA PEDICELLATA Bak. ex Benth. in Trans. Linn. Soc. XXX, 563. A tall erect unarmed tree sometimes over 100 feet high, young shoots dark-coloured, faintly rusty-puberulous, bark darkcoloured; stem 3 feet in diam., heart-wood black. Leaves evenly 2-pinnate; rachis 5-8 in. long, with a large sessile gland 5 in. above base, stipules persisting as two firm recurved thickly coriaceous hooklets; pinnæ 6-12-jugate, 4-6 in. long, the main and secondary rachises alike puberulous; leaflets 12-16-jugate, oblong-obtuse, sessile, with slightly obliquely rounded base, rigidly subcoriaceous, 5-75 in long, 3-4 in. wide, dark-green above, pale but hardly glaucescent beneath, reticulate-veined, quite glabrous on both surfaces. Flowers in many-fld. umbels '75-1 in. across, yellowish-white with green stamens; peduncles slender finely pubescent, 1-1.25 in. long, panicled in fascicles of 2-8 on nodes towards the apices of numerous axillary main-rachises, the nodes sometimes evolved as branchlets 1-2 in. long so as to form compound umbels; main-rachis puberulous, the peduncular portion beneath the flowers 3 in. long towards ends of branches, to 12-15 in. long in the axils lower down; pedicels rusty-pubescent very slender, 25-3 in. long. Calyx 15 in. long, teeth short deltoid, densely pubescent externally. Corolla 3 in. long, teeth ovate-acute externally, densely pubescent as is the tube. Filaments connate at base in a white tube shorter than corolla, free portions of filaments over 1 in. long, brightgreen. Pod indehiscent, 12-18 in. long, 2.25-2.5 in. wide, very thin and brittle, pale yellowish-brown, very faintly reticulated opposite the seeds, sinuate-repand along the unthickened sutures. Seeds 6-9, transversely ovate, 25 in long, 2 in wide, much compressed, testa smooth dark-brown. Bak. in Flor. Brit. Ind. II, 299.

Perak; Goping, Ulu Babong, etc. Kunstler 4474! 7988! 10436

PENANG; Waterfall, Curtis 1921! MALACCA; Maingay 581! 586! Goodenough, 1796! SINGAPORE; Kranji Road, Ridley 6297!

A very fine species.

6. ALBIZZIA ODORATISSIMA Benth. in Hook. Lond. Journ. Bot. III, 88. A tall erect unarmed tree sometimes 100 feet high, young shoots rather dark-coloured, stem 2-25 feet in diam., heart-wood black. Leaves evenly 2-pinnate; rachis 6-12 in. long, finely-downy, with a large sessile gland '5 in. above base and 1-2 small ones between the bases of the distal pairs of pinnæ, stipules small quite deciduous; pinnæ 3-4-(rarely 2-) jugate, usually 5-8 in. long, the secondary rachises glabrous or pubescent; leaflets 8-24-jugate, obliquely oblong, sessile, obtuse, with very obliquely rounded base, rigidly subcoriaceous, '75-1 in. long, '3-5 in. wide, dark-green above, glaucescent beneath, recticulate-veined, the midrib removed by one-third from, and parallel to, the upper edge, glabrous or faintly sparsely adpressed-hairy above, more densely adpressed-hairy beneath. Flowers in numerous small 10-12-fld. heads. '75-1 in. across, vellowish-white with pale-vellow stamens; peduncles slender, puberulous, 75 in. long, solitary or oftener in fascicles of 3-6 on nodes in the upper third of numerous small corymbose branchlets 2-2.5 in, long, themselves in panicles 8-12 in, long at the ends of leafy branches; pedicels O. Calya O5 in. long, teeth obsolete, tube campanulate, externally densely pubescent. Corolla 15 in. long, oblong in bud, teeth ovate-lanceolate, externally densely grey-silky as is the tube. Filaments connate at the base in a white tube half as long as that of the corolla, free portion of filaments 4 in. long, pale-yellow. Pod indehiscent, 6-9 in. long, 12-16 in. wide, thin, flexible, warm-brown, glossy or dull, sutures straight or slightly repand; valves uniformly wide-reticulate. Seeds 8-12, broadly ovate, 3 in. long, 25 in. wide, much compressed, testa smooth, dull greenish-yellow, faintly areolate. Bedd. Flor. Sylvat. t. 54; Bak. in Flor. Brit. Ind. II, 299. Albizzia micrantha Boiv. Eneye. II, 34; Miq. Flor. Ind. Bat. I, 24. Acacia odoratissima Willd. Sp. Pl. IV, 1063; DC. Prodr. II, 466; Wall. Cat. 5234; W. & A. Prodr. 275. Acacia lomatocarpa DC. Prodr. II, 467. Mimosa odoratissima Linn. f. Suppl. 437; Roxb. Cor. Pl. t. 120; Hort. Beng. 40; Fl. Ind. II, 546. Mimosa marginata Lamk. Encyc. Meth. I, 12. The BLACK SIRIS.

MALACCA; (fide Baker). DISTRIB. India and Indo-China.

Mr. Baker notes the presence of this in Malacca and the species is therefore included here. It is, however, possible that Mr. Baker's specimens are from planted trees, for no botanist has ever communicated Malayan specimens to the Calcutta Herbarium.

7. ALBIZZIA PROCERA Benth. in Hook. Loud. Journ. Bot. III, 89.

An erect unarmed tree 60-80 feet high, young shoots rather pale, much lenticelled, subrugose, glabrous, bark pale-gray outside reddish within, stem 1.5-2 feet in diam.; heart-wood brown. Leaves evenly 2-pinnate; rachis 12-18 in. long, glabrous, with a large gland '25 in. above the base; pinnæ 2-6-jugate, 5-6 in. long, secondary rachises glabrous, with sessile ovate gland below the last pair of leaflets; leaflets 6-12 jugate, obliquely ovate to ovate-oblong with peticlules 05 in. long, blunt or subacute, the base obliquely cuneate on upper rounded on lower margin; thinly coriaceous, 1-1.5 in, long, (in young trees sometimes 2 in, long) and 6-8 in. wide, dark-green glabrous above, paler beneath and when young densely silvery later sparsely adpressed-pubescent. Flowers in numerous small 20-25-fld. heads, 75 in across, yellowish-white with pale-yellow stamens; peduncles slender puberulous or glabrous, 5 in. long, in fascicles of 3-5, less often solitary on nodes in the upper half of numerous racemose branchlets 3-5 in. long at the ends of leafy branches; pedicels 0. Calyx 1 in. long, teeth triangular distinct, glabrous externally as is the tube. Corolla 25 in. long, teeth lanceolate half as long as tube, densely uniformly pubescent externally. Filaments connate at base in a yellow tube as long as that of corolla, free portion of filaments 35 in. long, greenish-yellow. Pod at length dehiscent. 4-8 in. long, 7-9 in, wide, thin, flexible, bright reddish-brown, glossy, sutures straight, slightly thickened; valves not reticulated. Seeds 6-12, broadly ovate, 35 in. long, 25 in. wide, much compressed, testa smooth pale-brown. Bedd, Flor. Sylvat. 96; Miq. Flor. Ind. Bat. I, 21; Bak. in Flor. Brit. Ind. II, 299. Acacia procera Willd. Sp. Pl. IV, 1063; DC. Prodr. II, 466; W. & A. Prodr. 275. Acacia elata Grah. in Wall. Cat. 5233; Voigt, Hort. Suburb. Calcutt. 261 (not Mimosa elata Roxb.). Mimosa procera Roxb. Cor. Pl. t. 121; Hort. Beng. 93; Flor. Ind. II, 548.

Andamans; Coco Group, common, Prain! DISTRIB. Indo-China, China; Malay Archipelago.

It is strange that though this species extends from Nepal to Central China on the north and from Java to the Philippines on the south, it should never have been collected in the Malay Peninsula. More extraordinary still, though quite common at the north end of the Andamans, it seems to be altogether absent from the southern islands of that group and from the Nicobars.

8. ALBIZZIA LUCIDA Benth. in Hook. Lond. Journ. Bot. III, 86. An unarmed decidnous tree 50-60 feet high, all parts glabrous, bark thin, greyish, pustular, stem 1-1.5 feet in diam.; heart-wood pale-brown. Leaves evenly 2-pinnate, rachis 1.5-2.5 in. long, quite glabrous, with a sessile cup-shaped gland 3-8 in. above the base and with another near the tip; pinnæ usually 1-jugate with secondary rachis 2-3.5 in. long, with a gland on upper side .25 in. below the distal pair of leaflets and often with a second .25 in. below the penultimate pair, the leaflets usually 2-,

sometimes 3-, rarely 1-jugate, (when leaflets 3-jugate on the distal pinnæ, leaves occasionally with a second pair of pinnæ with short eglandular rachis under 5 in. long, bearing 1 pair of small leaflets); leaflets ovate to elliptic-oblong or oblong-lanceolate, apex rather abruptly acuminate, base obliquely cuneate, glossy dark-green above, dull paler beneath, glabrous on both surfaces, thinly chartaceous, decreasing downwards, the distal pairs 4 in. long, 1.5 in wide, the lowest 1.5 in. long. ·7 in. wide. Flowers in small heads ·6-:7 in. across, yellowish; peduncles slender, faintly puberulous, '75-1 in. long, solitary or in fascicles of 2-3 in corymbs on nodes in the upper fourth, or subumbellate at the tips, of numerous branchlets 1.5-6 in. long, themselves in corymbose panicles 8-10 in. long and nearly as wide, at the ends of leafy branches: pedicels 05-1 in. long. Calyx 07 in. long, campanulate, faintly toothed, externally puberulous. Corolla 2 in. long, teeth lanceolate, uniformly sparsely silky externally. Filaments connate at base in a white tube slightly shorter than that of corolla, free portion of filaments 35 in. long, pale-yellow. Pod at length dehiscent, 6-10 in. long, 1-1.25 in. wide, thin, flexible, pale-brown, dull, reticulated opposite the seeds, smooth glossy elsewhere. Seeds 6-8, orbicular, 3 in. in diam., much compressed, testa smooth, pale-brown. Benth. Pl. Jungh. 268; Miq. Flor. Ind. Bat. I, 18; Bak. in Flor. Brit. Ind. II, 299. Mimosa lucida Roxb. Hort. Beng. 40; Flor. Ind. II, 544. Inya lucida Wall. Cat. 5267 mostly.

SINGAPORE: file Baker. DISTRIB. Eastern Himalaya and Indo-China; also Java (fide Miquel).

Like A. odoratissima this species is included on the authority of Mr. Baker, who records it from the Malayan Peninsula. Dr. Miquel reports it also from Java, but no British or Dutch botanist has ever sent a Malayan specimen to Calcutta.

#### 70. PITHECOLOBIUM Mart.

Erect trees. Leaves abruptly 2-pinnate. Flowers in globose heads, rarely in small loose spikes or subumbellate corymbs, usually hermaphrodite and pentamerous. Calyx campanulate or funnel-shaped, shortly toothed. Corolla funnel-shaped, the petals united below from one-half to two-thirds their length. Stamens monadelphous, much exserted; anthers without glands. Ovary sessile or stipitate, many-ovuled; style filiform, stigma minute capitate. Pod strap-shaped, circinate or rarely falcate or nearly straight, usually dehiscent throughout the lower suture and much twisted in a late stage, sutures not or slightly thickened.

Species about 100; cosmopolitan in the Tropics, about 80°/o American, only 1-2 African.

Armed with spinescent stipules; seeds arillate; (pinnæ of leaves 1-jugate, their rachises gland-bearing; leaflets 1-jugate; peds close-spiral, dehiscent along lower suture,		
testa of distant seeds thin) Unarmed; seeds without arillus:—		P. dulce.
Pod indehiscent, (horse-shoe shaped), seeds (distant) with a thick leathery testa; (pinnæ 1-jugate, their rachises		
gland-bearing, leaflets glabrous 2-jugate)  Pods dehiscent, seeds with a thin crustaceous testa:—	_	P. confertum.
Pods straight or slightly falcate, opening along both		
sutures, valves thick, fleshy, seeds close-set, mutually		
compressed; (pinnæ 1-jugate, their rachises gland-		
bearing, leaflets glabrous 1-2-jugate)	3.	P. bubalinum.
Pods spirally twisted, opening only along the lower		
suture, valves coriaceous, seeds distant :		
Pods deeply lobed between the seeds half-way down		
to upper suture or further, dehiscing only opposite		
the seeds; (pinnæ 1-jugate, their rachises gland-		
bearing, leaflets glabrous 2-3-jugate)	4.	P. lobatum.
Pods only faintly sinuate on lower suture between the		
seeds, dehiscence along lower suture continuous:-		
Pinnæ 1-jugate without glands on their rachises;		
(leaflets glabrous):-		
Pods large, '75 in. broad; seeds somewhat com-	_	
pressed, 6 in long; leaflets 2-jugate apex acute	5.	P. nicobaricum.
Pods small, 4 in. broad; seeds pisiform, 2 in.		
across; leaflets 3-4-jugate, apex caudate-acuminate		n
Pinnæ more than 1-jugate or, if casually 1-jugate	6.	P. microcarpum.
then with glands on their rachises; (pods large):—		
Pods broad, 1.25 in. wide or more; leaflets very		
large, glabrous; (pinnæ 2-jngate, distal much		
exceeding the proximal casually absent pair) :-		
Rachises of pinnæ with glands between each		
pair of leaflets; flowers in dense many-fld.		
heads 75 in. across; leaflets shining on both		
surfaces; branches of paniole terete	7.	P. affine.
Bachises of pinnæ with glands between bases of		
terminal leaflets only; flowers in few-fld. heads		
2 in. across; leaflets dull beneath, branches of		
panicle subcompressed	8.	P. ellipticum.
Pods narrow, 75 in. wide or less; leaflets medium		
or small, puberulous or pubescent beneath:-		
Flowers large (5 in long); pod long stipitate, seeds with long axis parallel to sutures;		
(pinnæ 2-jugate or casually 1-jugate, leaflets		147
	0	D Fanali
Flowers small (under 25 in. long); pod short-	J.	P. Kunstleri.
stipitate, seeds with long axis transverse:—		
040		

Florets sessile, branches terete; leaflets of distal pinnæ 15-20-jugate; (pinnæ 5-8-jugate, leaflets small, all rhomboid, the distal pairs not much exceeding the others) ... 10. P. contortum. Florets pedicellate, branches angled; leaflets of distal pinnæ 5-8-jugate: —

Pinnæ 3-6- (rarely 8-10-) jugate; leaflets small, all trapezoid, the distal pairs not much exceeding the others; glands stipitate ... ... ... ... ... 11. P. Clypearia. Pinnæ 2-4-jugate; leaflets medium, terminal cuneate at base, considerably exceeding the subtrapezoid others; glands sessile ... 12. P. angulatum.

PITHECOLOBIUM DULCE Benth. in Hook. Lond. Journ. Bot. III, 199. A tree 25-40 feet high with glabrous branches; stem 2 feet in diam., the ultimate branchlets pendent, armed with stipular thorns. Leaves evenly 2-pinnate, rachis 1 in. long glabrous, basal gland 0, with a sessile small cupped-gland at its apex between the bases of the 1jugate pinne, with secondary rachises '25 in long also gland-bearing at apices between the bases of the 1-jugate leaflets glabrous on both surfaces, pale-green, approximated, oblique obovate-oblong, rigidly subcoriaceous, obtuse or occasionally subacute, 1-2 in. long, 3-7 in, wide; stipules ascending, 2-3 in. long, converted into conical smooth thorus, the main and secondary rachises both shortly produced in acute points. Flowers in dense heads '4-'5 in. iu diam., on puberulous pedicels '25 in. long, solitary or 2-3 together in the axils of small lanceolate bracts ·1 in. long, along slender nodiform branchlets slightly zig-zag towards their tips, glabrous or puberulous, striate, from 3-5 in. long, the bracts of the lower two-thirds accompanied by minute stipular spines, those of the lowest fourth often replaced by reduced foliage leaves; the branches arranged in terminal panicles 7-12 in. long, 5-8 in. wide, extending into the upper axils. Calyx . 05 in. long, grey-downy, subcampanulate, shortly toothed. Corolla white, 1 in. long, puberulous tube wide-infundibuliform, rather longer than the ovate-acute teeth. Filaments united at base in a tube as long as that of the corolla, shortly Ovary puberulous, shortly stipitate. Pod turgid, twisted, dehiscent along the lower suture, both sutures slightly indented between the seeds, 4-5 in. long, 5 in. wide; glabrous, wide-reticulated, the valves coriaceous, claret-red when ripe. Seeds 6-8, obovate-oblong, 5 in. long, 3 in. wide, 2 in. thick, testa smooth shining purplish, enveloped in a firm edible pulpy pale arillus. Miq. Flor. Ind. Bat. I, 40; Bedd. Flor. Sylvat. t. 188; Bak. in Flor. Brit. Ind. 11, 302. Mimosa dulcis Roxb.

Cor. Pl. I. t. 99; Hort. Beng. 40; Flor. Ind. II, 556. Inga dulcis Willd. Sp. Pl. IV, 1005; DC. Prodr. II, 436; Wall. Cat. 5282; W. & A Prodr. 268; Wight, Ic. t. 198.

Cultivated in most of the Provinces; Penang; Curtis 59! Singa-PORE; Maingay 579! Andamans: common. NICOBARS; Car Nicobar, King's Collector! .

A native of America whence it has been introduced, by way of the Philippines, to Malaya generally, and to India.

PITHECOLOBIUM CONFERTUM Benth. Trans. Linn. Soc. XXX, 304. An unarmed small tree with glabrous lenticelled branchlets with darkbrown bark. Leaves evenly 2-pinnate, rachis glabrous '75 in. long, with no basal gland but with a long elliptic gland just below the bases of the 1-jugate pinnæ; rachises of pinnæ glabrous, 2 in. long, with glands between the bases of each of the 2 pairs of leaflets glabrous on both surfaces, bright-green shining above, paler dull beneath, rigidly papery, oblong, shortly obtusely pointed, cuneate at base, distal 3:25-3:75 in. long, 1.75-2 in. wide, proximal 2.5 in. long, 1.25 in. wide, lateral nerves 3-4 pairs ascending; petiolules distinct, glabrous, 2 in. long. Flowers in small 5-10-fld. heads '75 in. across, on pubescent pedicels ·75 in. long, arranged in small axillary and terminal corymbs 2 in. long and broad with pubescent main-rachises, 1 in. long or less. Calyx sessile '05 in. long, puberulous, campanulate, teeth obsolete; bracteoles minute. Corolla white, 25 in long, tube glabrescent externally, twice as long as the lanceolate teeth, puberulous on the outside. Filaments united at base in a tube slightly longer than that of corolla, free portion white, exserted 35 in. Ovary glabrous, subsessile. Pod indehiscent, slightly turgid, horse-shoe shaped or loosely spirally twisted, 10-12 in. long, 1.5 in. wide, sutures firm not at all indented between the seeds, valves thinly coriaceous, glabrous, shining, faintly wide-reticulate. Seeds 11-13, compressed ovate, '75 in. long, '5 in. wide, '25 in. thick; testa brown, dull, areolate on the outside, thick, tough and leathery. Bak. in Flor. Brit. Ind. II, 304. Albizzia splendens Miq. Flor. Ind. Bat. Suppl. 280.

MALACCA; Griffith 1951! Goodenough 1766! Hervey! DISTRIB. Sumatra (Teysmann 4228)!

This species is remarkable in having pods that do not twist spirally and that are apparently quite indehiscent. The seeds have no true arillus but have a thick softly coriaceous tough coat which apparently takes the place of an arillate structure.

3. PITHECOLOBIUM BUBALINUM Benth. Trans. Linn. Soc. XXX, 576. An unarmed tree 30 feet high with pale-brown pubescent branchlets and grey bark. Leaves evenly 2-pinnate, rachis puberulous 5 in. long, with no basal gland but with a round gland just below the bases of the

1-jugate pinnæ; rachises of pinnæ '75-1'75 in. long with glands between the 1-2 pairs of deaflets, the leaflets oftener 1- than 2-jugate. sometimes 1-jugate on one and 2-jugate on the other pinna of the same leaf; leaflets glabrous on both surfaces, bright-green shining beneath as well as above, rigidly papery, oblong-lanceolate, shortly subacutely pointed, cuneate at base, distal 4-5 in. long, 1.75-2.25 in wide, proximal 2.5 in. long, 1.25 in. wide, lateral nerves 4-5 pairs ascending, petiolules distinct, glabrous, 2 in. long. Flowers in small 5-8-fld. heads '3 in. across, on puberulous very slender pedicels .4-6 in. long, fascicled in the axils of small bracts and subumbellate at the tips of puberulous peduncles '75 in. long, subcorymbosely set on branchlets 2.5 in. long, themselves disposed in terminal and axillary panicles 6-8 in. long, 4-6 in. wide. Calyx sessile '05 in. long, pubescent, campanulate, teeth short, deltoid, bracteoles minute. Corolla white, 12 in. long, teeth lanceolate nearly as long as tube, uniformly puberulous externally. Filaments united in a tube longer than that of corolla, free portion white, exserted, 35 in. long. Ovary pubescent, distinctly stipitate. Fod dark-green inside, reddish outside, dehiscent along both sutures, oblong, straight or falcate, apex obtuse, base obliquely rounded, 3-4 in. long, 1 in. wide. •75 in. thick, sutures thin not at all indented, valves thick, fleshy, fætid, densely shortly velvety externally. Seeds 8-10, crowded, ovoid. with sides flattened from mutual compression, '75 in. long, '4 in. wide and as thick, testa thin crustaceous smooth shining dark-purple; arillus absent. Bak. in Flor. Brit. Ind. II, 304. Inga bubalina Jack, Mal. Miscel. II, 7. 77; Hook. Comp. Bot. Mag. I, 224.

Penang; fide Baker. Malacca; Griffith! Maingay 576! Goodenough 1552! DISTRIB. Sumatra (Jack; Forbes 1801!)

Jack gives the Malay name of this as "Bua Karbau" in Sumatra; Forbes does not give any native name. In Malacca the name given by Griffith is "Ingria," that noted by Goodenough is "Gérdas Padi." The fleshy pod is eaten, in spite of its offensive odour.

4. PITHECOLOBIUM LOBATUM Benth. in Hook. Lond. Journ. Bot. III, 208. A tree 60-80 feet high with spreading crown, stem 15-20 in. thick; branchlets glabrous; bark grey. Leaves evenly 2-pinnate; rachis glabrous '6-1 in. long, with a gland near the middle but none at base or between the bases of the 1-jugate pinnæ; rachises of pinnæ glabrous 4-6 in. long, with gland between the bases of the 2-3-jugate leaflets; leaflets oblong to oblong-lanceolate, acute, base cuneate, firmly papery, flexible, glabrous and shining on both sides, medium-green, distal pair 5-8 in. long, 2-3 in. wide, proximal 3 in. long, 1.5 in. wide; petiolules glabrous, '25 in. long. Flowers in small 3-5-fid. heads '25 in. across, on glabrous slender pedicels '2-3 in. long, solitary or 2-3 together on nodes with small glabrous bracts along glabrous branchlets 1-4 in. long,

the larger paniculately branched; fascicled in leaf-axils and on nodes below the leaves near and at the ends of branches. Calyx sessile, glabrous or sparsely puberulous, '05 in. long, tube campanulate, teeth short deltoid ciliate, bracteoles minute glabrous. Corolla white, glabrous, 15 in long, tube infundibuliform one and a half times the length of the lauceolate teeth. Filaments united at base in a tube rather shorter than that of corolla, free portion white, exserted, 25 in. long. Ovary glabrous, stipitate. Pod 9-10 in. long, horse-shoe shaped or loosely spirally twisted, valves firmly coriaceous, glabrous, deeply lobed along the lower suture half-way or more towards the entire upper, indehiscent in the sinuses, but dehiscing along the convexities of the one-seeded suborbicular rudely umbonate lobes 2 in. in diam., 1 in. thick. Seeds 3-6, (usually some of the lobes are abortive, occasionally two may be confluent), orbicular, '75 in, in diam., '35 in thick, testa dark-brown, thin, rather dull, crustaceous; arillus absent. Hassk. Retzia I. 222; Miq. Flor. Ind. Bat. I, 33; Bak. in Flor. Brit. Ind. II, 305. Mimosa Koeringa Roxb. Hort. Beng. 40. M. Djiringa Roxb. Hort. Beng. 93. M. Kaeringa Roxb. Flor. Ind. II, 543. M. Jiringa Jack, Mal. Miscell. I, 1. 14; Hook. Bot. Misc. I, 282. Inga Jiringa Jack, Mal. Miscell. II, 7. 78. Inga attenuata Grah. in Wall. Cat. 5276. Inga lobata Grah. in Wall. Cat. 5280A. Inga bigemina Bl. Cat. Buitenz. 88; Hassk. Cat. Bog. 291, not of Willd. Acacia Koeringa Royle, Ill. Him. Pl. 183. Pithecolobium Koeringa Kuntze MSS. in Herb. Kew.

Penang; Curtis 105! 711! 720! 2916! Perak; Wray 499! Kunstler 5665! 7116! 8651! 10841! Malacca; Griffith 1954! Maingay 572/2! Singapore; Kunstler 1163! Hullett 47! Distrib. Tenasserim; Sumatra, ("wild," Forbes 1519! 3051!); Java, cultivated (Kurz 2110! Koorders 4199! 11514!); Philippines, (fide Baker).

Curtis gives the Malay name in Penang as "Jereng;" Jack gives "Bua Jiring" as the name in Sumatra; Roxburgh uses this name and, perhaps, also the name "Koeringa."

Specimens issued by Javanese botanists as P. bigeminum always belong to this species; P. bigeminum does not occur anywhere in the Malayan countries. Hasskarl states that the name "Tjering" is, in Java, limited to the eastern parts of the island where alone the tree occurs uncultivated. The cultivated tree in West Java is termed "Djenkol." This last is the only name cited by Koorders and Valeton (Bigar. I, 268) who say that, though occurring as an escape, the tree is nowhere

Roxburgh, it is to be noted, published two names:—Mimosa Koeringa (Hort. Beng. 40)—this he afterwards described as having seeds covered with edible fleshy pulp; and M. Djiringa (Hort. Beng. 93)—this he never did describe. It is to the former alone that Royle adverts under the name Acacia Koeringa, and it is the latter alone that Jack is careful to cite as synonymous with his Inga Jiringa. Of Inga Jiringa Jack does not say that the seeds are enveloped in pulp; he is careful, however, to imply that, like I. bubalina, its seeds have no arillus, but that the legume

is fleshy and esculent. When therefore Bentham and, following him, Miquel describe the seeds of their *Pithecolobium lobatum*, for which they cite both of Roxburgh's names, as enveloped in edible pulp, they give a character derived from Roxburgh's description of *M. Koeringa* only.

On Burmese specimens Sir D. Brandis has noted "fruit sold;" Gallatly says "edible.....common in the bazars;" Kurz has said nothing about the fruits or seeds and has not described the latter; Baker too has refrained from describing them. Hasskarl in describing the use of the fruits does not say whether it is the pod or the seed that is employed; he does say that the pulp of the seed disappears when the fruit is ripe!\* Koorders and Valeton say that the feetid seeds are eaten cooked. Watt in the Dictionary of the Economic Products of India only quotes Roxburgh. What the actual facts may be it is for Malayan botanists to declare. Is it the succulent pod, a fleshy pulp, or the seed itself of Jiring that is eaten? And has Jiring any pulp at all? If so, is this pulp an arillus?

Roxburgh, though he laboured under the double disadvantage of working in the East, and of dealing largely with living plants, was nevertheless remarkably given to being accurate; in spite of the fact that systematists in Europe, whose labours have been simplified by being confined to dried specimens, propose to unite the two, the writer thinks it should be left an open question whether there may not be a Pithecolobium Koeringa whose seeds have an edible pulp, and a Pithecolobium Jiringa without a pulp enveloping the seeds. If this be so, these are the names that should be used to designate the two trees, since the name P. lobatum, though the best to employ so long as the point is in dubiety, must obviously be discarded should it be found that Roxburgh was right.

- PITHECOLOBIUM NICOBARICUM Prain. A small tree with slender glabrous zig-zag branchlets with dark greenish-brown bark. Leaves evenly 2-pinnate; rachis 75 in. long, glabrous, with a gland just above the middle but none at base or between the l-jugate pinne; rachises of pinnæ 1.5-2 in. long, glabrous, glandless; leaflets 2- (very rarely 3-) jugate, ovate-lanceolate, gradually tapering to the acute apex and cuneate base, bright-green, glabrous on both surfaces, shining above, duller beneath, distal pair 3-4 in. long, 1.4-1.8 in. wide, others 1-2.5 in. long, 5-1.25 in. wide; petiolules distinct, glabrous, 'l in. long. Flowers in small few-fld. heads on puberulous pedicels 25 in. long, in terminal and axillary racemes .75-2 in. long. Calyx pubescent, campanulate, .05 in. long, teeth deltoid, small. Corolla and stamens not seen. Pod dehiscent along lower suture, 5-6 in. long, 75 iu, wide, spirally twisted. valves thickly coriaceous, glabrous, dull, purplish-red, sinuate between the seeds along the upper margin. Seeds 8-10, orbicular-ovate, somewhat compressed, '6 in. long, '5 in. wide, '25 in. thick, testa thin, crustaceous, dark-purple smooth shining; arillus absent. Albizzia bubalina (Pithecolobium bubalinum) Kurz, Journ. As. Soc. Beng. XLV, 2. 129 not of Benth. Pithecolobium oppositum Kurz, loc. cit., not of Miq.
- \* There is no pulp visible in any of our specimens at Calcutta in any stage of the pod, whether the specimens come from Burma, the Malay Peninsula, or the Archipelago.

# NICOBARS; Nancowry, Jelinek! Kamorta, Kurz!

The Nicobarese name for this tree is "Kawas." Kurz has erred in identifying it with P. bubalinum Bth., which it does not much resemble as regards leaves and which it is totally unlike as regards fruits. He has erred still further in identifying it with P. oppositum Miq. which he supposed to be identical with P. bubalinum. In reality P. oppositum has 2-jugate leaves, with leaflets more like those of P. microcarpum than like those of either P. bubalinum or P. nicobaricum, and with the gland on the main-rachis similarly situated. In spite of the fact that Miquel's specimens have neither flowers nor fruits, the writer thinks they belong to a tree that, though a member of the same group as, is probably quite distinct from, all three species mentioned.

PITHECOLOBIUM MICROCARPUM Benth. in Trans. Linn. Soc. XXX, 576. An unarmed tree 30-70 feet high, with stender pubescent branches with red anastomosing wrinkles, stem 10-15 in thick, bark greyishbrown. Leaves evenly 2-pinnate, rachis puberulous 5-75 (rarely 1.25-1.5) in. long, with a gland just below the middle but none at base or between the 1-jugate pinnæ; rachises of pinnæ 2-4 in. long, puberulous, glandless; leaflets 3-4- (rarely only 2-) jugate, firmly chartaceous, ovate, apex rather long obtusely caudate-acuminate, base of distal leaflets cuneate of the others rounded, dark-green shining above, glaucescent beneath, glabrous on both surfaces, distal pair 4-6 in. long, 2-3 in. wide, proximal 3 in. long, 1.5 in. wide; petiolules distinct, glabrous, 15 in. long. Flowers in small 5-8-fld. heads 4 in. across, on puberulous slender pedicels 4-6 in. long, fascicled in the axils of small bracts and subumbellate at the tips of puberulous peduncles I in. long, subcorymbosely set on branchlets 2-3 in. long, themselves disposed in terminal and axillary panicles 6-8 in. long, 4-6 in. wide. Calyx sessile glabrescent, 05 in. long, tube campanulate, teeth short deltoid, bracteoles short lanceolate. Corolla white, '15 in. long, teeth ovate-lanceolate equalling the tube, uniformly glabrous externally. Filaments united in a tube shorter than that of corolla, free portion white, exserted, 35 in. long. Ovary glabrous subsessile. Pod dehiscent along lower suture, spirally twisted, 1.75-2 in. long, 3-4 in. wide, sutures thin, the upper very faintly sinuate between the seeds, the valves thinly coriaceous, waxy bright-red. Seeds 8-10; pisiform, 2 in. in diam., testa thin, crustaceous, smooth, shining, dark-purple; arillus absent. Bak. in Flor. Brit. Ind. II, 304. Inga bubalina Wall. Cat. 5272 not of Jack. Pithecolobium bigeminum VAR. bubalina Benth, in Hook. Lond. Journ. Bot. III, 207; Miq. Flor. Ind. Bat. I, 33 and Suppl. 281, as to the Wallichian synonym only.

Perak; Scortechini 64! 1978! Kunstler 1297! 5492! 5842! 10354! 10729! 10802! PENANG; Porter (Wall. Cat. 5272)! Curtis 1093! MALACCA; Griffith 1947! Maingay 567! 574! Goodenough 1413! Derry 1161! Hervey! SINGAPORE; Ridley 1631! 6666! T. Anderson 40! Kurz! DISTRIB. Sumatra (fide Miquel); Borneo.

This very common species has been compared with *P. bubalimum*; in reality the resemblance is very superficial; the leaves differ in having glandless secondary rachises, the leaflets are quite different in shape and the flowers are also very different; in inflorescence the two species are, however, remarkably similar. The nearest ally is undoubtedly *P. oppositum* Miq., of which neither flowers nor fruits are yet known. The leaflets of the two species are of the same shape and have the same caudate tips but those of *P. oppositum* are rather thinner in texture and have puberulous instead of glabrous petiolales besides being arranged on 2 pairs of pinnæ whereas none of our numerous examples of *P. microcarpum* have more than 1 pair of pinnæ.

Goodenough gives "Kradus" as the Malay name in Malacca.

PITHECOLOBIUM AFFINE Bak. ex Benth. in Trans. Linn. Soc. XXX, 577. A small unarmed tree 15-25 feet high, stem 6-8 in. in diam., young branches rusty-puberulous to pubescent. Leaves evenly 2-pinnate, rachis glabrous or puberulous 4-6 in. long, with a large sessile gland 35 in. above the base, and with similar glands between the bases of the 1-2-jugate pinnæ; secondary rachises of distal pinnæ 6 in. long, with leaflets 4-, (less often 3-) jugate, of proximal pinnæ when present 1.5-2.25 in. long with leaflets 2- (sometimes only 1-) jugate, both with glands between the bases of each pair of leaflets; leaflets papery, glabrous on both surfaces, bright-green, glossy, obovateacute with subequal cuneate bases, diminishing downwards, distal pair 6-7 in. long, 3-3.25 in. wide, proximal 3 in. long, 1.5-1.75 in. wide; lateral nerves 4-6 pairs ascending; petiolules distinct, glabrous, '15 in. long. Flowers in dense heads '75 in. across, on slender peduncles '6 in. long, arranged singly or in fascicles of 2-3 together along branchlets 3-8 in. long, themselves forming an ample terminal panicle 10-15 in. long and broad. Calyx subsessile, minutely bracteolate at the base, 15 in. long, tube funnel-shaped, teeth very short, uniformly brown-silky externally. Corolla white, 25 in. long, uniformly grey-silky externally, teeth ovate-lanceolate, half as long as tube. Filaments united in a tube as long as that of corolla, exserted 35 in., pure white. Ovary puberulous. shortly stipitate. Pod dehiscent along lower suture, spiral, 8 in. long, 1.25 in. wide, hardly sinuate along upper suture, valves thinly coriaceous, glabrous, shining, faintly wide-reticulate, dark-green externally, bright orange-red within. Seeds 6-8, transverse, ovate-oblong, 1 in. long, 5 in. wide, 4 in. thick, testa thin crustaceous dark-purple smooth shining: without arillus. Bak. in Flor. Brit. Ind. II, 304.

MALACCA; Maingay 577! Hervey! PERAK; Kunstler 3406! 3957! 5560! SINGAPORE; Tanjong Bunga, Ridley 6408! DISTRIB. Burma (Brandis!); Borneo.

The pod is given in the *Flora of British India* as 25 in. wide; this may be a misprint for 1.25 in. At all events the fruit of the species of which Maingay n. 577 forms the basis is as now described. The Borneo locality is given doubtfully

by Mr. Bentham; the pod which he describes, and which belonged to his Borneo specimens, evidently agrees very closely with that of the Peninsular plant.

PITHECOLOBIUM ELLIPTICUM Hassk., Retzia I, 225. A tree 15-30 feet high (occasionally higher) branchlets tawny-puberulous soon glabrescent, bark grey. Leaves evenly 2-pinnate, rachis glabrous 3-4 in. long, with a large gland above base and another between the bases of the distal pinnæ; pinnæ 2-jugate, rachises of distal pair 4-7 in. long, with small glands between each pair of leaflets except the lowest, of proximal pair often only subopposite always within an inch of base of main-rachis .75-1 in., with gland between the end pair of leaflets; leaflets very large, of upper pinnæ 3-4-jugate, distal 6-8 in. long, 25-3 in. wide, of proximal 3 in. long, 2 in. wide; leaflets of lower pinnæ usually 2-jugate, distal 4 in. long, 15 in. wide, lowest 2 in. long, 1 in. wide, the leaflets often unequally-jugate on the corresponding pinnæ of the same leaf, elliptic-oblong, apex rather abruptly pointed, base rounded, glabrous on both surfaces, bright green shining above, paler dull beneath; petiolules glabrous, 25 in. long, lateral nerves 5-8 pairs, ascending. Flowers' in very small 2-5-fld. heads '2 in. or less across, on short tawny-puberulous peduncles 25-35 in long, solitary or 2-3 vertically superposed above the axils of bracts with a large gland, on subcompressed branchlets 1.5-6 in. long, also 2-3 vertically superposed above the axils of larger bracts 25-6 in long with a large sessile gland and small rudimentary leaflets; the branches of each axil diminishing downwards; branches themselves similarly disposed on a subcompressed tawny-pubescent main-rachis as a terminal panicle 16-20 in. long, 6-12 in. wide. Calyx campanulate, tawny-pubescent, 05 in. long, teeth short obtuse. Corolla yellow, silky, 15 in. long, teeth ovate-lanceolate nearly as long as tube. Filaments united at base in a thick short ring, yellowish, 2 in. long, shortly exserted. Ovary with a short stipe as long as staminal tube. Pod spirally twisted, 3-7 in. long, dehiscent along the lower suture, 1.25 in. wide, valves firmly coriaceous, glabrous, dull, darkgreen, at length becoming yellow externally, orange within. Seeds 3-7, oblong, 8 in. long, 6 in. wide, 4 in. thick, testa thin, crustaceous, darkpurple, smooth, shining; without arillus. Inga elliptica Bl. Cat. Gew. Buitenz. 88; Ind. Kew. I, 1216. Inga Jiringa Wall. Cat. 5268 not of Jack. Inga Clypearia Wall. Cat. 5270 B. not of Jack. Pithecolobium fascioulatum Benth. Hook. Lond. Journ. Bot. III, 208?; Miq. Flor. Ind. Bat. I, 33; Bak. in Flor. Brit. Ind. II, 304. Albizzia fasciculata Kurz, Journ. As. Soc. Beng. XLV, 2. 129, excl. syn. Pithecolobium macrophyllum Teysm. & Binnend.

NICOBARS; Kamorta, Kurz! KEDAH; Pulo Songsong, Curtis 2604! PAHANG; Pulo Chugu, Ridley 2637! MALACCA; Griffith! Goodenough 1894! Maingay 571 | 578! PERAK; Wray 542! 2666! 4171! Scortechini 1159! 1790! Kunstler 2326! 3331! 3771! 4799! 4822! 5674! 6637! 10104! Penang; fide Baker. Singapore, fide Baker. Distrib. Borneo (fide Miquel); Java! and Sumatra!

A very common species for which none of our English collectors have cited a Malay name; Hasskarl and Miquel give the Javanese name as "Kitjang."

This is certainly the *P. fasciculatum* alike of Baker and of Miquel and is the *Albizzia fusciculata* of Kurz. Mr. Baker moreover quotes Wall. Cat. 5268—the basis of Bentham's species, and Wall. Cat. 5270 B. from Singapore as the same. There is unfortunately no example of either of these Wallichian numbers at Calcutta though there are examples both of the Griffithian and the Maingayan Malacca sheets named *P. fasciculatum* by Mr. Bentham himself. The original description given by Mr. Bentham states that the pinnæ of *P. fasciculatum* are 1-jugate, and the account of the species being incomplete in other respects it seems better to treat the identity of Bentham's plant with Hasskarl's one as doubtful. As regards Hasskarl's plant no dubiety is possible; his description is very complete and accurate and there is besides an authentic example of his species in the Calcutta Herbarium. Since in any case Hasskarl's name conserves the oldest specific epithet, it may be better to continue its use even if it should turn out that Bentham's *P. fasciculatum* is really the same thing.

Mr. Kurz's identification of *P. macrophyllum* T. & B., with this species cannot be sustained, for Teysmann's tree is a very distinct one with pods lobed as in *P. lobatum* though with leaves very different from those of *P. lobatum*; the leaflets while much larger than, considerably resemble those of *P. ellipticum*. Mr. Kurz's notice of *P. macrophyllum* T. & B., in 1876, appears to be the earliest mention of the plant. As another species from America, *P. macrophyllum* Spruce, was published in 1875, it is necessary to re-name Teysmann's plant *P. Teysmanni*.

By a lapsus calami the Index Kewensis gives Inga elliptica Bl. as the name, Pithecolobium ellipticum Hassk. as a synonym, for our species; the reverse is the actual state of affairs. The tree has not been sent to Calcutta from Penang or from Singapore during recent years.

PITHECOLOBIUM KUNSTLERI Prain. A tree 20-30 feet high, with spreading branches; branchlets slightly pubescent, stem 8-12 in. thick, bark brown. Leaves evenly 2-pinnate, rachis puberulous 1.5-2.5 in. long, with 1 or 2 large elliptic glands some distance below the bases of the 1 or 2 pairs of pinnæ; rachises of terminal pinnæ 4 in. long with large glands some distance below the bases of the 3 pairs of leaflets, basal rachises when present 5 in. long with a gland some distance below the 1-jugate leaflets; leaves in the inflorescence sometimes small with short 1-jugate pinnæ and small 1-jugate leaflets; leaflets ovate with rounded bases and rather long candate-acuminate blunt apices, pale vellowish-green, glabrous shining above, dull uniformly sparsely adpressed-puberulous beneath, distal pair 3-4.5 in. long, 1-2 in. wide, proximal 1-2 in. long, 5-1 in. wide; those of the basal pinnæ 1.5-2.5 in. long, 1-1.5 in. wide; petiolules puberulous, 15 in. long. Flowers in 4-8-fld. heads 5-75 in. across, on puberulous pedicels 5 in. long, sparsely racemose, singly or 2-3 together in axils of bracts or subumbellate or

corymbose at the ends of branchlets 1-2 in. long, disposed in lax terminal panicles extending into the upper leaf exils, 6-12 in. long, 4-8 in. wide. Calyx. sessile, tubular, '15 in. long, densely pubescent externally, teeth short triangular; the bracteoles small spathulate, pubescent. Corolla white, '5 in. long. densely silky externally, tube narrowly funnel-shaped, teeth lanceolate '12 in. long. Filaments at base united in a white tube puberulous outside, as long as that of corolla, free portion glabrous bright-yellow, 1·25 in. long. Ovary very long, stipitate, pubescent. Pod with a puberulous stipe '75 in. long, dehiscent along the lower suture, spirally twisted, 8-10 in. long, '6 in. wide; valves thinly coriaceous puberulous, not sinuate between the seeds. Seeds 8-10, ovate, their long axis parallel with sutures, '7 in. long, '4 in. wide, compressed, testa palebrown, crustaceous, shining.

Perak; at low elevations, Kunstler 7875! Scortechini 178! Johore; Lake & Kelsall 4072! DISTRIB. Borneo.

A very distinct species; more nearly related to the Indian P. bigeminum than to any Malayan species but easily distinguished by its large florets and its long-stipitate pod.

10. PITHECOLOBIUM CONTORTUM Mart. in Flora XX, 2. Beibl. 115. A tree 15-30 feet high, with spreading grey-pubescent terete or slightly compressed branches, stem 4-6 in. thick, bark dark-brown. Leaves evenly 2-pinnate; rachis terete, pubescent, 4-8 in. long, petiolar portion 2 in long with a large gland below the middle, foliar portion with 1-4 small glands below as many pairs of pinnæ; pinnæ usually 5-8-jugate, sometimes as few as 3-jugate, rarely as many as 15-jugate, rachises with 1-2 small sessile glands below bases of end-pairs of leaflets, diminishing downwards, the distal 4-6 in. long, the basal 1.5-2 in.; leaflets of upper pinnæ 15-20-jugate, of lowest 9-10-jugate, oblong or trapezoid, obtuse or subacute at upper angle, base obliquely unilaterally truncate, upper and lower margins subparallel, main nerve diagonal; rigidly papery, pale-green puberulous above, pubescent beneath, 5-75 in. long, 25-35 in wide, petiolules 0. Flowers in terminal and axillary simple deltoid panicles 1 foot across, with slender main-rachis 8-20 in. long, the filiform pubescent branches 3-8 in. long, bracts small lanceolate, pedicels puberulous 25-4 in. long, the sessile florets scattered or subaggregated near their tips in the axils of small acute puberulous bracteoles. Calyx 05 in , campanulate, puberulous, teeth triangular. Corolla greenish-white, glabrous, 15 in. long, teeth lanceolate spreading, almost as long as tube. Filaments united below in a tube as long as that of corolla, free portion cream-coloured, 35 in. long. Ovary faintly puberulous, stipitate. Pod 6-8 in. long, 5-7 in. wide, spirally twisted, dehiscing along the lower suture; valves firmly coriaceous, finely pu-272

berulous externally, bright orange, within smooth, vermilion, stipe '2 inlong; slightly sinuate between seeds on lower margin. Seeds 8-10, ovate, with long axis across the pod, '35 in long, '25 in wide, '2 in thick, testa dark-purple, thin, crustaceous. Benth. in Hook. Lond. Journ. Bot. III, 210; Bak. in Flor. Brit. Ind. II, 305. Inga contorta Grah. in Wall. Cat. 5283. Inga Finlaysoniana Grah. in Wall. Cat. 5284.

Kedah; Ridley 5223! Penang; Porter (Wall. Cat. 5283)! Stolizka! Curtis 19! 264! Malacca; Griffith 1941! Maingay 573! Hervey! Derry 149! Perak; Scortechini 1658! 1899! Wray 2636! 4249! Kunstler 1010! 3775! 3889! Singapore; Finlayson.

Nearest P. Clypearia but very easily distinguished by its terete branches and its sessile glands, as well as by its sessile florets.

PITHECOLOBIUM CLYPEARIA Beuth. in Hook. Lond. Journ. Bot. III, 209. A tree 25-30 feet high with spreading brown-pubescent angular branches, bark dark-brown. Leaves evenly 2-pinnate; rachis angular. puberulous, 2-7 in. long, petiolar portion 1-1.5 in. long with a large shortly stipitate gland just above base, foliar portion with small distinctly stalked glands just below each pair of pinnæ except the lowest, pinnæ usually 3-6- (rarely 8-10-) jugate, their rachises with small stipitate glands between each pair of leaflets except the lowest. diminishing downwards, distal 5-6 in. long, basal 1.5-2 in. long; leaflets of upper pinnæ 5-7-jugate, of lowest 3-4-jugate, trapeziform, widetriangular at upper angle, base obliquely unilaterally truncate or rounded, upper and lower margins subparallel, main nerve diagonal; rigidly papery, dark-green glabrous or faintly puberulous shining above. glancous with scattered adpressed hairs beneath, terminal 1.5 in. long, ·75 in. wide, lowest ·5 in. long, ·3 in. wide; petiolules 0. Flowers in small subumbellate corymbs 35-4 in. across, on short peduncles 3-5 in. long, solitary or 2-3 vertically superposed above the axils of bracts with a large gland, on angular branchlets 3-4 in. long similarly disposed on the angular main-rachis but with the bracts reduced to an angled petiolale bearing a large bract at its tip; pedicels of florets 'I in. long, slender, pubernlous, their bracteoles minute or obsolete; the whole inflorescence forming a large terminal panicle extending into axils of upper leaves, 15-18 in. long, 10-15 in. wide. Calyx campanulate, 05 in. long, puberulous externally, teeth short deltoid. Corolla white, glabrous, 'l in. long, teeth lanceolate half as long as tube. Filaments united at base in a tube shorter than that of corolla, free portion white, 35 in. long. Ovary puberulous stipitate. Pod spirally twisted, 4-5 in. long, 4 in. wide, dehiscing along the lower suture, valves thinly corraceous, orange outside, red within, glabrous; stipe 15 in. long; distinctly sinuate between

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the seeds on lower margin. Seeds 8-10, ovate, with long axis across the pod, 25 in. long, 2 in. across, 15 in. thick, testa dark-purple, thin, crustaceous. Pl. Jungh. 268; Miq. Flor. Ind. Bat, I, 35; Bak. in Flor. Brit. Ind. II, 305. Mimosa trapezifolia Roxb. Hort. Beng. 93; Fl. Ind. II, 546. Inga dimidiata Hook. & Arn. Bot. Beech. Voy. 181. Inga Clypearia Jack, Mal. Miscell. II, 7. 78?; Hook. Comp. Bot. Mag. I, 224; Wall. Cat. 5270A. Chypearia rubra Rumph. Herb. Amboin. III, 176 t. 112?

PENANG; Porter (Wall. Cat. 5270 A)! Curtis 209! PROV. WEL-LESLEY; Kunstler 1612! PAHANG; Ridley 1476! SINGAPORE; T. Anderson 38! Hullett 58! 5698! MALACCA; Griffith! Maingay 570! Hervey! Perak; Scortechini 481! 2024! Wray 1889! 2643! Distrib. Sumatra, Java, Moluccas.

This is apt, when its leaflets are unusually small, to simulate P. contortum from which it is, however, easily distinguished by its smaller fruits, its pedicelled florets, and its terete branchlets. It is also apt, when its leaflets are unusually large, to simulate P. angulatum; as both have angular branches and pedicelled florets the only safe diagnostic character is the nature of the glands, especially those on the partial rachises of the pinnæ; these glands are stipitate in P. Clypearia, sessile in P. angulatum.

There is just a trace of doubt as to whether this is Rumphius' Clypearia rubra since that author figures no glands, or even that it is Inga Clypearia Jack, since Jack says there is no petiolar gland on the leaf of his species. Jack's plant is, he says, known in Sumatra as "Jiring muniet."

12. PITHECOLOBIUM ANGULATUM Benth. in Hook. Lond. Journ. Bot. III, 306. A tree 25-30 feet high with spreading shortly puberulous angular branches, bark dark-brown. Leaves evenly 2-pinnate; rachis angular, puberulous, 3-8 in long, with a large sessile gland 5-75 in. above the base and near the middle of the petiolar portion, foliar portion with smaller sessile glands below the bases of all but the last pair of pinnæ set obliquely on the upper truncate ends of sharp-edged ridges; pinnæ 2-4-jugate, their rachises with similar but small glands just below each pair of leaflets, the distal 6-7 in., the lowest 1-1 5 in. long; leaflets of upper pinnæ 5-8-jugate, of lowest 2-3-jugate, all diminishing downward; terminal leaflets of most of the pinnæ 3.5-6° in. long, 1.25-2 in. wide, ovate-lanceolate, gradually tapering to an acute tip, the base wide-cuneate, the midrib central, the bases of the remainder progressively more obliquely rounded and the midribs progressively more diagonal, proximal leaflets 1 in. long, 75 in. wide; all membranous, sparsely puberulous above, softly pubescent beneath when young; thinly subcoriaceous, dark-green glabrous shining above, dull pubernlous beneath when mature, lateral nerves 5-7 pairs rather prominent beneath; petiolules 07 in. long. Flowers in small subumbellate corymbs '5 in. across, on short peduucles '75 in. long, fascicled

in axils of small gland-bearing bracts on angular branchlets 4-10 in. long, themselves fascicled in axils of bracts with a large basal gland and a foliar simply-pinnate rudimentary lamina, so as to form a terminal panicle extending into axils of upper leaves, 15-20 in. long, 12-18 in. wide; pedicels of florets 2-25 in. long, bracteoles minute or obsolete. Calyx puberulous, campanulate, '05 in. long, teeth short acute. Corolla pale-yellow or white, 2 in. long, tube infundibuliform, teeth lanceolate half as long; uniformly sparingly silky. Staments united in a tube nearly as long as that of corolla, filaments white or faintly tinged with pink, 5 in. long. Ovary puberulous, shortly stalked. Pod spirally twisted, 7-8 in. long, 7 in. wide, dehiscing along the lower suture, valves firmly coriaceous, red opposite the seeds elsewhere orange and puberulous externally, red and glabrous within; distinctly sinuate between the seeds on the lower margin, stipe very short. Seeds 8-10, ovate-oblong, '5 in. long, '35 in. wide, '2 in. thick, testa dark-purple, dull, thin, crustaceous. Mig. Flor. Ind. Bat. I, 34; Bak. in Flor. Brit. Ind. II, 306. Mimosa heterophylla Roxb. Hort. Beng. 40; Flor. Ind. II, 545. Inga acutangula Grah. in Wall. Cat. 5271. Pithecolobium acutangulum Mig. Flor. Ind. Bat. Suppl. 282.

Andamans; very common. Nicobars; King's Collector! Penang; Wallich 5270 C! Curtis 489! Malacca; Derry 552! 971! Maingay 569! Perak; Scortechini! Wray 1102! Selangor; Kunstler 8669! Singapore; Hullett 802! Itidley 5576! 6407! Goodenough 289! Distrib. Eastern Himalaya, Assam, Burma, Sumatra.

A rather variable species, with two leading types, hardly, however, to be distinguished even as varieties owing to the number of intermediate forms that occur. Of these, (a.) heterophylla—the original plant of Roxburgh with large terminal leaflets—extends from the Himalaya to Chittagong, the Andamans and Sumatra. This is very uniform in character and constitutes both Inga acutangula Grah. (Wall. Cat. 5271), and Pithecolobium acutangulum Miq., although it happens that Miquel when describing P. acutangulum conceived it to be different from Inga acutangula. The other plant, (3.) intermedia—with smaller terminal leaflets and usually more numerous pinna and leaflets—extends from Upper Burma east of the Irrawaday though the Shan Plateau to Tenasserim, the Malay Peninsula and Java. This is less uniform than the preceding and often has leaflets so like those of P. Clypearia that it can only be safely distinguished by its longer pedicels and sessile glands. This is the plant of Wall. Cat. 5270 C, from Penang, and is the Pithecolobium angulatum of Miquel as opposed to that author's P. acutangulum. P. angulatum Benth., like P. angulatum as defined in this paper, includes both plants.

#### ORDER XXXIX. ROSACEÆ.

Herbs, shrubs or trees. Leaves stipulate, rarely opposite, simple or compound. Flowers usually bisexual and regular (very irregular in Chrysobalanese). Calyx-tube free or adnate to the ovary, limb usually

5-lobed, often bracteolate, imbricate or valvate. Petals 5, or 0, inserted under the margin of the disc, deciduons, usually imbricate. Disc lining the calyx-tube or forming a ring at its base. Stamens perigynous, indefinite (rarely 1, 5 or 10) in one or many series, often connate and unilateral in Chrysobalaneæ; filaments subulate or filiform, usually incurved in bud; anthers small, didymous. Ovary of one or more free or connate carpels, with free or connate basal lateral or subterminal styles; stigmas simple, penicillate or capitate; ovules 1 or more in each carpel. Fruit variable, consisting of achenes or berries or drupes, rarely capsular. Seeds erect or pendulous, testa membranous or coriaceous, albumen 0; cotyledous large, plano-convex; radicle short.—Distrib. About 1,200 species, found in all climates and countries, but chiefly in the temperate.

Of the ten tribes into which this order is subdivided by Messrs. Bentham and Hooker in their Genera Plantarum, only four are (as yet) represented by specimens from the Provinces within our area, and these four tribes are represented by only six genera which Sir Joseph Hooker (in his Flora of British India) distinguishes as follows:—

Tribe I. CHRYSOBALANEE. Flowers usually irregular. Carpel 1; style basal; ovules 2, ascending. Fruit a drupe. Radicle inferior.—Trees or shrubs with simple quite entire leaves.

Calyx-tube elongate. Stamens many, united in a phalange. Ovary 2-locellate

Calyx-tube short. Stamens 2. Ovary I-celled ... 1. PARINARIUM.

1. Thirth II Parinarium.
2. Parastrmon.

Tribe II. PRUNEÆ. Flowers regular. Carpel 1, rarely 2; style subterminal, rarely basal; ovules 2, pendulous. Radicle superior.—Trees or shrubs with simple usually serrated leaves.

Calyx 5-lobed. Petals 5, large, glabrous. Carpel solitary, fruit

Calyx 5-10-toothed. Petals 5 and minute, or absent. Carpel

1. Drupe coriaceous, usually elongated transversely
Tribe III. Ruber. Flowers regular. Calyr ebracteolate. Stamens very numerous. Carpels many; styles sub-basalor ventral; ovules 2, collateral, pendulous. Fruit of many dry or fleshy carpels, not included in the calyr-tube. Radicle superior.—

Usually shrubs, often with compound leaves

Tribe IV. Pomer. Flowers regular. Calyx-tube (or the apex of the peduncle) becoming fleshy after flowering, and enclosing the carpels. Stamens numerous. Ovules 2 or more, ascending. Fruit a pome or berry; with 2-5 bony or coriaceous 1-seeded stones; shrubs or trees

. 6. Pyrus.

4. PYGEUM.

5. RUBUS.

## 1. PARINARIUM, Juss.

Trees. Leaves simple, alternate, evergreen, quite entire. Flowers hermaphrodite, in panicles or corymbose racemes, 2-bracteolate, white or pink. Calyx-tube oblong, campanulate, turbinate, or funnel-shaped;

lobes 5, thick, subequal, imbricate. Petals 5, sessile or clawed, decidu-Stamens 6-30, the filaments united into an incomplete ring at the base, or connate into an unilateral bundle, all perfect or some without anthers. Carpel 1, adnate to one side of the calyx-tube, 2-celled, rarely 2-seeded; style basal, filiform; ovules 2 collateral, or 1 erect. Drupe spherical, oblong, obovoid or ovoid, with a 1-2-celled, 1-2-seeded, woody or bony or rarely coriaceous pericarp. Seeds erect, testa membranous, cotyledons large fleshy, radicle small inferior. DISTRIB. About 50 species, natives of the tropics of both worlds.

Calyx-tube villous inside. Fruit 2-celled, more than 5 in. long; the pericarp woody, bony or crustaceous.

Leaves rusty-grey or dirty white beneath, with numerous spreading parallel stout nerves; stamens 8-10, not united in a phalange.

Leaves with 10-12 pairs of main nerves, rustypubescent beneath ... Leaves with 15-18 pairs of main nerves, pale, areolate and puberulous beneath ... Leaves with 25-30 pairs of main nerves, pale, obliquely areolar and puberulous on the nerves beneath... 3. P. oblongifolium. Leaves glabrous beneath or with only a few strigose hairs on the midrib near its base; main nerves 10-16 pairs, always spreading.

Flowers in spikes, sessile, solitary.

Stamens about 10; fruit about 1 in. in diam.

Stamens 12-16; fruit several inches in diam. Flowers in racemes or panicles.

·Leaves subsessile with broad bases; main nerves 12-14 pairs; fruit ovoid, not compressed Leaves distinctly petiolate.

Leaves oblong-lanceolate, narrowed at the base; stamens 10 Leaves elliptic-oblong, broad at the base; stamens

Leaves quite glabrous on both surfaces; main nerves 5-7 (rarely 10) pairs, obliquely ascending, never spreading.

Flowers straight; petals subequal.

Main nerves of leaves 6 or 7 pairs; fruit covered with crustaceous scurf, its cells glabrous inside Main nerves 7-10 pairs; fruit quite glabrous, its cells sericeous inside ...

Flowers much curved; sepals and petals very unequal 11. P. heteropetalum. Calvx-tube glabrous and lined by the glabrous staminal tube; fruit less than '5 in. long, quite glabrous; the pericarp

... 12. P.? nitidum. thin, leathery ... PARINARIUM COSTATUM, Blume Mel. Bot. (1855) Pt. 1. A small

1. P. costatum.

P. polyneurum.

4. P. spicatum.

5. P. Maingayi.

P. asperulum.

8. P. scabrum.

... 9. P. Kunstleri.

... 10. P. Griffithianum.

tree: young branches slender, deciduously puberulous, the bark pale

and minutely lenticellate. Leaves coriaceous, ovate-elliptic or ovatelanceolate, shortly and obtusely acuminate, the base rounded or cuneate: upper surface glabrous and shining except the pubescent midrib, the lower pale brown when dry, reticulate and covered, except the 10 or 12 pairs of conspicuous slightly ascending glabrous main nerves, with a thin layer of cobwebby hair; length 1.5-3 in., breadth .75-1.25 in.; petiole :25 in., pubescent. Panicles axillary, longer than the leaves, with a few distant short few-flowered branches, tawny-tomentose. Flowers nearly 25 in. long, on short pedicels, solitary or in cymes of three. Calyx-tube densely puberulous outside, internally with a line of subulate processes at the throat and a broad belt of deflexed silky hair, the ovate lobes shorter than the tube. Petals thin, obovate, clawed, longer than the calyx-lobes, sparsely pubescent. Stamens about 8, half of them anantherous, the filaments villous. Pistil 1, the ovary villous. Fruit oblong, blunt, slightly compressed, with many pale scurfy patches, slightly more than 1 in. long and 65 in. broad. Miq. Fl. Ind. Bat. Vol. I, Pt. 1. 354; Hook, fil. Fl. Br. Ind. II, 311 (excl. syn. P. sumatranum, Benth. and Kurz's Petrocarpa sumatrana); Jack Mal. Misc. II, VII, 67. Eleocarpus? punctatus, Wall. Cat. 2676.

MALACCA; Maingay 621, 621/2. PENANG; Curtis 259, 2163. PERAK; King's Collector 5227. SINGAPORE; Ridley 398.

2. PARINARIUM POLYNEURUM, Mig. Fl. Ind. Bat. Suppl. 306. A. tree 60 to 100 feet high; young branches slender, pale brown, profusely lenticellate, puberulous. Leaves coriaceous, oblong or ovate-oblong, rather bluntly acuminate; the base rounded, eglandular; upper surface glabrous, shining; the lower pale, areolate, puberulous; main nerves 15 to 18 pairs, spreading, prominent beneath; length 3 to 5 in., breadth 1.35 to 2 in. Panicles axillary and solitary, or terminal and in clusters of 2-4, rather shorter than the leaves when in flower, longer in fruit, hoary-tomentose; the branches short, rather crowded, the ultimate branchlets cymosely 3-flowered; bract shorter than the calvxtube, oblong, obliquely acute, tomentose. Flowers 25 in. long, on very Calyx infundibuliform, tomentose outside, deflexedvillous inside; the lobes lanceolate, acuminate, pubescent on the inner face. Petals as long as the calyx-lobes, oblong, slightly dilated upwards, obtuse, not clawed at the base, glabrous. Stamens 10, shorter than the petals, all bearing anthers. Ovary sericeous. Style glabrous. Fruit oblong, compressed, obtuse, slightly tapered to the base, covered with a dense layer of tawny scurf, about 2 in. long when ripe and 1.2 in. across, 2-celled; pericarp crustaceous, very hard, 25 in. thick.

MALACCA; Griffith, Maingay 622. PERAK; King's Collector 4624, 6087. DISTRIB. Sumatra.

3. Parinarium oblongifolium Hook fil. Fl. Br. Ind. II, 309. A tree 50-70 feet high; young branches lenticellate, deciduously puberulous. Leaves very coriaceous, oblong- or oblong-elliptic, the apex subacute, the base rounded; upper surface glabrous and shining, the lower pale with oblique areolae, puberulous on the nerves and midrib; main nerves 25-30 pairs, stout, oblique, rather straight; length 5.5-8.5 in., breadth 1.85-3 in.; petiole 35-65 in., stout. Panicles axillary and terminal, solitary, many-flowered, spreading, minutely tawny-tomentose, 3-6 in. across. Flowers 2 in. long, on very short pedicels; bracts ovate-rotund, concave, acute, tomentose. Calyx-tube infundibuliform, subgibbous, minutely tomentose outside, deflexed-villous inside, lobes broadly ovate, acute. Petals not longer than the calyx-lobes, spathulate, glabrous. Stamens 8, about as long as the petals. Ovary villous; style sparsely pubescent. Fruit elliptic-ovoid, obtuse, compressed, densely coated with grey hard scurf, 2.75 in. long and 1.5 in. in diam.

MALACCA; Griffith, Maingay 623. PAHANG; Ridley 5026. PERAK; King's Collector 10369, 10422.

A species readily distinguished by its large oblong fruit, large leaves with numerous parallel nerves prominent on the lower surface, and small flowers with the stamens and petals not longer than the calyx-lobes. It approaches *P. sumatranum*, Miq. in its leaves, but the under-surface in that species is uniformly and minutely tomentose, whereas in this the under surface has very peculiar oblique areolae and there is no tomentum. The fruits of the two differ also in size.

4. PARINARIUM SPICATUM, King, n. sp. A tree 60 to 80 feet high; branches slender, dark-coloured, puberulous. Leaves coriaceous, ellipticovate, shortly and broadly acuminate, the base rounded but slightly produced along the sides of the upper half of the petiole; both surfaces reticulate when dry; the upper glabrous, shining; the lower slightly dull and paler, minutely pustulate, glabrous except the sparsely strigose midrib; main nerves about 12 pairs, spreading, faint; length 2-3 in., breadth ·85-1·6 in., petiole ·1 in. Spikes axillary and terminal, about as long as the leaves, in clusters of 2 or 3, everywhere tawny-pubescent with many adpressed hairs intermixed. Flowers 5 in. long, solitary, rather distant, sessile, bibracteate at the base; the bracts much shorter than the flower, oblong, subacute, tomentose. Calyx-tube narrowly funnel-shaped, slightly gibbous, tomentose outside, deflexed-villous in its upper part inside; its lobes broadly oblong, obtuse, deflexed. Petals longer than the calvx-lobes, broadly elliptic, very obtuse, glabrous. Stamens about 10, longer than the petals, shorter than the pistil; the filaments glabrous, united at the very base. Ovary sericeous; style sparsely hairy in its lower half, otherwise glabrous. Fruit about 1 in. in diam., suborbicular, slightly compressed, densely covered with a yellowish crustaceous scurf, 2-celled; the pericarp 2 in. thick, tomentose inside.

PERAK; King's Collector 6145, 10326.

This approaches P. costatum, Bl. in the shape and nervation of its leaves; but is distinguished from that species by its spicate inflorescence and solitary flowers. Its fruit also is more orbicular than that of P. costatum.

.5. PARINARIUM MAINGAYI, King n. spec. A tree; young branches with dark bark bearing a few oblong lenticels, glabrous. Leaves very coriaceous, elliptic oblong, very shortly and obtusely acuminate, the base rounded; both surfaces glabrous and with minutely papillate reticulations, the upper shining, the lower dull and rather pale; main nerves 10-12 pairs, spreading, curving, rather prominent beneath; length 3-4.5 in, breadth 1.35-2 in.; petiole 3 in., stout. usually in pairs, axillary, shorter than the leaves, pedunculate, minutely tomentose. Flowers sessile, 3 in. long, or (to the apex of the stamens) 6 in.; bracts shorter than the calyx-tube, broadly ovate-obtuse, tomentose. Calyx-tube infundibuliform, tomentose outside, deflexed-villous inside; the lobes short, broad, rounded very obtuse. Petals longer than the calyx-lobes, obovate, sessile, glaberulous. Stamens 12-16, much longer than the petals, decurved. Ovary densely wooly; style long, slender. Drupe spherical, the size of a small apple (Hooker); the pericarp thick and bony, smooth on the inner surface, furrowed on one side. Seed large, with a thin texta. P. asperulum, Hook. fil. in Fl. Br. Ind. II, 310 (not of Mig.)

MALACCA; Mainyay 618, and probably also Griffith 2049.

This in some respects resembles P. asperulum and P. scabrum, but differs from both in its much larger fruit and sessile flowers, and from the former also in the venation of its leaves.

6. Parinarium elatum, King n. spec. A tree 60-120 feet high; young branches as thick as a quill, blackish-cinereous, lenticellate. Leaves thickly coriaceous, subsessile, elliptic to ovate-elliptic, acute or shortly acuminate; the base broad, rounded or minutely cordate; upper surface glabrous, shining, the main nerves and midrib slightly prominent; lower surface darker and duller than the upper when dry, glabrous except a few strigose hairs at the base of the very prominent midrib; the 12-14 pairs of spreading curved main nerves very prominent; length 4.5-7.5 in., breadth 1.5-3.25 in.; petiole only about 15 in., strigose. Panicles axillary, solitary or several together, shorter than the leaves, with few short rather distant branches, or unbranched, minutely tomentose, few-flowered; bracts 2 at the base of each flower, slightly shorter than the calyx-tube, elliptic, acute, adpressed-pubescent. Calyxtube funnel-shaped, adpressed-tomentose outside, deflexed-villous inside at the mouth; the lobes unequal, nearly as long as the tube, broadly ovate, subacute, very tomentose on both surfaces. Petals longer and

more narrowed than the calyx-lobes, subacute, glabrous. Stamens longer than the petals, glabrous. Ovary sericeous, the style glabrous in its upper half. Fruit ovoid, not compressed, crustaceous-scurfy outside, pale-brown, 2-celled, 1.15 in. long and '8 in. in diam.; the pericarp crustaceous, '2 in. thick, minutely hairy inside.

PERAK; King's Collector, 3436, 3711.

A species resembling P. oblongifolium, Hook. fil. in its leaves which however have fewer nerves; but differing greatly from that species both in its inflorescence and flowers.

PARINARIUM ASPERULUM, Miq. Fl. Ind. Bat. Suppl. 307. A tree 50-80 feet high; young branches slender, with dark-coloured bark and a few scanty deciduous pale flexuous hairs. Leaves thinly coriaceous, oblong-lanceolate, tapering gradually to the obtusely acuminate apex; the blade narrowed slightly to the base and continued along the sides of the upper half of the short petiole; both surfaces glabrous and with minute pitted papillæ, the lower paler and more reticulate; main nerves 10-16 pairs, faint, spreading; length 3-5.5 in., breadth 1-1.65 in., petiole 25 in. Racemes or panicles axillary or terminal, solitary, half as long as the leaves, minutely tomentose; the flowers about 3 in. long, (6 in. to the apex of the exserted stamens); the pedicels 1 in. long: bracts at the base of the flower 2, obtuse, tomentose. Calyx densely tomentose; the tube clavate, deflexed-pilose inside; the lobes broadly ovate, subacute, imbricate. Petals longer than the calyx-lobes, obovateoblong, not clawed, glabrous. Stamens about 10; the filaments glabrous, united at the base. Ovary densely and the style sparsely villous. Fruit sub-ovoid, compressed, very obtuse, with a vertical groove along the two sides, minutely rugulose and densely covered with hard palebrown scurf, nearly 1 in. long and 6 in. broad, 2-celled; pericarp thick, bony, hairy inside.

Penang; Curtis, 203. Pahang; Ridley, 2603. Perak; King's Collector, 3537, 7568. Distrib. Sumatra.

There is an original and authentic specimen of *P. asperulum* in the Calcutta Herbarium collected by Teysmann in Sumatra, and it agrees absolutely with the Penang and Perak specimens above quoted. The species is near to *P. scabrum*, Hassk., but has fewer stamens and smaller and differently shaped leaves. The ripe fruit is also presumably much smaller, for specimens of unripe fruit of *P. scabrum* are as large as specimens of ripe fruit of this species.

8. Parinarium scabrum, Hassk. Cat. Hort. Bot. Bogor. (1844), 269. A tall tree; young branches dark-coloured and with a few scattered hairs. Leaves coriaceous, elliptic-oblong, shortly and bluntly acuminate; the base broad, rounded or very slightly cuneate, eglandular; both surfaces glabrous, shining, strongly but minutely reticulate, and with numerous small perforate-topped papillæ especially on the reticulations; main

nerves 13-15 pairs, slender, spreading, with a few shorter intermediate; length 4-6 in., breadth 1.75-2.75 in., petiole 2 in. Panicles (sometimes reduced to racemes) axillary and terminal, often two or three together, much shorter than the leaves, adpressed-pubescent; the flowers not numerous, collected near the ends of the branches; bracts oblong, obtuse, pubescent, shorter than the calyx-tube. Flowers (from the point of insertion) 5 or 6 in long; the calyx-tube merged in the pedicel, clavate, pubescent outside, deflexed-villous inside. Calyx-lobes ovaterotund, undulate, subacute, imbricate, minutely tomentose on both surfaces. Petals larger than the calyx-lobes, obovate, clawed, glabrescent. Stamens 12-16; the filaments united at the base into a tube open at one side, much curved, deflexed. Ovary lanate, 2-celled. Style sparsely pubescent, shorter than the stamens. Fruit ovoid, obtuse, slightly compressed, vertically grooved, rough and covered with pale scurf; pericarp bony, thick, 2-celled, the cells pubescent, 1 in. long and 6 in. broad (not ripe). Hassk. in Flora (1844), p. 585. Miq. Fl. Ind. Bat. Vol. I, pt. I, 354 t. V.

PERAK; Scortechini 1981.

Only once collected in Perak. This species is very closely allied to *P. glaber-rimum*, Hassk. and I greatly doubt whether the two should be kept separate. The latter species is described at great length by Hasskarl in the volume of Flora for 1844, p. 533; but I have seen only one authentic specimen, and that consists only of leaves. *P. scabrum*, on the other hand, is described by Hasskarl in nine words: but of it there are in the Calcutta Herbarium several excellent authentic flowering specimens. And with these Scortechini's specimens numbered 1981 agree absolutely.

9. Parinarium Kunstleri, King n. spec. A tree 50-80 feet high; young branches slender, cinereous, glabrous. Leaves coriaceous, oblong-lanceolate, tapering from about the middle to each end, the apex acuminate; the base acute, eglandular; both surfaces glabrous and rather dull, the lower with wide slightly conspicuous reticulations and minute papillæ; main nerves 6 or 7 pairs, curving upwards, only slightly conspicuous on the lower surface; length 3·25-4·5 in., breadth 1·15-1·65 in., petiole 25-3 in.,; lobes of the calyx oblong, obtuse, tomentose on both surfaces. Petals longer than the calyx-lobes, obtuse, glabrous. Stamens about 20 or 30, glabrous; the filaments united by their bases, longer than the petals. Style as long as the stamens, villous. Fruit oblong, ovoid, slightly compressed, obtuse, tapering slightly to the base, 1·25 in. long and about '9 in. broad, 2-celled, densely covered with palebrown crustaceous scurf; pericarp crustaceous, smooth inside.

PERAK; King's Collector 3715, 3745, 6917.

I have seen no specimens of this in flower. The description of the parts of the flower above given has been taken from withered remains found persisting at the base of some of the ripe fruits. In its leaves this resembles *P. asperulum*,

Miq., but there are only 6 or 7 pairs of nerves as against 10-16 pairs in that species. The fruits of this are moreover slightly larger and much more globular, and the interior of the cells is glabrous; whereas in those of *P. asperulum* the cells are hairy inside.

10. Parinarium Griffithianum, Benth. in Hook. Niger Flora, 334. A large tree (Curtis); young branches rather stout, with dark lenticellate bark. Leaves coriaceous, oblong-lanceolate or elliptic-lanceolate, caudate-acuminate, narrowed at the base to the short petiole; both surfaces glabrous, the upper very polished, the lower duller; main nerves 7-10 pairs, curving upwards, faint; length 3.5-6 in., breadth 1.2-2.25 in., petiole 25-35 in. Punicles axillary and terminal, pedunculate, longer than the leaves, pyramidal, nearly glabrous, the branches sparsely-flowered; bracts, if any, deciduous (not seen). Flowers 5 in. long, on short pedicels. Calyx-tube narrowly funnel-shaped, hoarypubescent, the lobes rotund. Petals broadly oblong, concave, subglabrous, about as long as the calvx-lobes. Stamens 20-30; the filaments longer than the petals, united at the base into a short tube. Ovary very tomentose; the style longer than the stamens, glabrous. Fruit narrowly ellipsoid or slightly obovoid, blunt, glabrous, 2-celled, about 1.5 in. long and .75 in. in diam.; pericarp crustaceous, .15 in. thick, lined with dense silky pubescence. Hook. fil. Fl. Br. Ind. II, 310. P. multiflorum, Mig. Fl. Ind. Bat. Vol. I, Pt. 1, 356. Maranthes multiflora, Korth. Verh. Nat. Gesch. Bot. 259, t. 70.

Malacca; Griffith 2047/2; Maingay 620. Pahang; Ridley 1354. Kedah; Curtis. Singapore; Ridley 4792. Penang; Curtis 1514, 2416.

Griffith's specimen 2047/2, which is the type of the species, has more polished leaves and an opener panicle than the other specimens quoted above. But I can detect no difference in the flowers. Griffith's specimen has no fruit, and the whole material is imperfect. It may turn out that there are really two species included under P. Griffithianum.

11. Parinarium heteropetalum, Scortechini MSS. A tree 60-80 feet high; young branches rather slender and with rather rough cinereous glabrous bark. Leaves coriaceous, eglandular, oblong-lanceolate, tapering from the middle to both ends, the apex acuminate, the base acute; both surfaces glabrous, rather dull when dry, the lower very minutely punctate; main nerves faint on both surfaces, 5 or 6 pairs, oblique, ascending; length 3.5-4.5 in., breadth 1-1.6 in., petiole 35 in., stout. Panicles axillary and terminal, about one-third to one-half as long as the leaves, with short branches, everywhere rusty-pubescent; bract at the base of the flowers solitary, lanceolate, tomentose. Flowers 5 in. long, sessile. Calyx-tube curved, narrowly tubular below the bend and suddenly expanded above it; the lobes thick, concave, reflexed, unequal, from oblong to suborbicular or obovate, everywhere pubescent

or tomentose, the hairs inside the tube not deflexed. Petals 5, pink, glabrous, longer than the calyx-lobes, very unequal; the two posterior erect, broadly elliptic, concave, clawed; the three anterior narrowly oblong, revolute, imbricate, flat. Stamens 25–30, in a single semi-tubular phalange, as long as the petals, glabrous; the anthers small. Ovary villous, 2-celled. Style curved, longer than the stamens, villous in the lower, glabrous in the upper half. Fruit unknown.

PERAK; Scortechini, 240, 2040. King's Collector, 664, 6899.

A species easily recognised by its curved flowers and very unequal sepals and petals.

12. PARINARIUM? NITIDUM, Hook. fil. Fl. Br. Ind. II, 310. A tree 15-40 feet high; young branches very slender, with pale-brown glabrous shining bark. Leaves elliptic to elliptic-lanceolate, shortly and bluntly acuminate, the blade much narrowed to the base and continued along the sides of the upper half of the petiole; both surfaces quite glabrous. the upper very shining; the lower slightly dull, paler, almost glaucous when young; main nerves 7-9 pairs, ascending, faint; length 2.25-3.5, rarely 4 in, breadth 8-1.75, rarely 2 or 2.5 in.; petiole below the winged part :1-2 in. Panicles slightly shorter or longer than the leaves, heavytomentose, axillary and terminal, with short sub-horizontal cymosely 3-flowered branches; bracts oblong, shorter than the flowers, broadly ovate, acute, concave. Flowers 15 in. long and about the same in width at the mouth, subsessile. Calyx widely funnel-shaped, the lobes broadly triangular, acute; the exterior hoary-tomentose; the interior lined by the subglabrous tube formed by dilated bases of the filaments, and with a thickened bairy process on the side opposite the 8-10 anthers. Petals longer than the calyx-lobes, oblong-obtuse, Ovary densely sericeous, the style short. Fruit obovoidrotund, glabrous, 1-celled, 35 in. long and about 25 in. in diam.; the pericarp thin, leathery, densely woolly inside.

Malacca; Griffith 2047/1, Maingay 619. Derry 189, 1180. Perak; King's Collector 8599, 8680, 8711. Penang; Gurtis 147, 853; King's Collector 1274, 1472.

Very few of the specimens which I have seen of this have fruit, and of these not one has a seed. When the material has been fully completed by the receipt of seeds, I think a new genus might with advantage be formed for this plant; for it differs from the other species of *Parinarium* here described in having a cushion-like process in its calyx-tube the other parts of which are lined by the tube formed by the lower part of the dilated filaments. It also has a small 1-celled fruit with a thin leathery pericarp.

## 2. PARASTEMON, A. DC.

A shrub or small tree. Leaves simple, alternate, evergreen, quite 284

entire. Flowers polygamo-diccious, minute, racemose, minutely bracteo-late. Calyx-tube shortly campanulate; lobes 5, imbricate. Petals 5, (or 6), oblong, deciduous. Stamens 2 perfect unilateral, and several imperfect. Carpel 1, adnate to one side of the calyx-tube, 1-celled; style basilar; ovules 2, erect. Fruit oblong, coriaceous, 1-celled, 1-seeded, indehiscent. Seed solitary, erect; testa membranous, pubescent; cotyledons fleshy, radicle inferior, plumule hairy.

Parastemon urophyllum, A. DC. in Ann. Sc. Nat. Ser. 2. XVIII, 208. A tall tree with pendulous habit, young branches very slender, glabrous. Leaves coriaceous, ovate-lanceolate to lanceolate, sometimes slightly oblanceolate, obtusely caudate-acuminate, the base much narrowed; both surfaces glabrous, the lower minutely lepidote; main nerves very faint, 4-6 pairs, oblique, the intermediate almost as distinct; length 2.5-3 in., breadth .85-1.5 in., petiole .25 in. Racemes nearly as long as the leaves, slender, axillary, glabrous, usually solitary but sometimes 2 together. Flowers .15 in. long to the apex of the stamens, on short pedicels each with a minute concave ovate bractcole at its base. Fruit cylindric, tapering a little to each end, glabrous, .45 in. long, and .25 in. in diam.

In all the provinces, except the Andamans.

#### 3. PRUNUS, Linn.

Shrubs or trees. Leaves alternate, simple, quite entire, or serrate or crenate or glandular-serrulate; petiole often 2-glandular. Flowers white or red, solitary, fascicled, corymbose or racemed. Calyx deciduous in fruit; lobes 5, imbricate. Petals 5. Stamens 15-60, perigynous, inserted in the mouth of the calyx-tube, filaments free. Carpel 1; style terminal; ovules 2, collateral, pendulous. Drupe with an indehiscent or 2-valved, 1-seeded, smooth, or rugged stone. Seed pendulous, testa membranous or coriaceous, albumen scanty or 0. Distrib. N. temp. regions, rare in the tropics; species about 80.

PRUNUS MARTABANICA, Kurz For. Flora Burma, I, 434. A tree 40-60 feet high; all parts, except the inflorescence, quite glabrous; young branches rather slender, lenticellate. Leaves membranous, elliptic-oblong to ovate-oblong, acuminate, suddenly slightly and often unequally narrowed to the base, with minute black dots on the lower surface; main nerves 5-7 pairs, spreading, very faint; length 3-6 in., breadth 1.65-2.5 in.; petiole 4-75 in., eglandular. Racemes solitary or in pairs, from the axils of fallen leaves and about as long as the leaves, pubescent. Flowers rather distant, about 35 in. in diam. on puberulous pedicels 3-35 in. long. Calyx-tube campanulate, tomentose; the lobes erect, ovate, subacute. Petals orbicular, about 1 in. long, deciduous.

Stamens 60-80. Ovary ovoid, glabrous, the style much longer than the stamens, the stigma dilated. Drupe cylindric, with a pointed apex and rounded base, glabrous, 1-1.25 in. long; pericarp thin, woody, smooth inside. Seed minutely hairy. Hook. fil. Fl. Br. Ind. II, 316. Cerasus? martabanica, Wall. Cat. 4902.

Andaman Islands; Kurz, King's Collectors. Distrib. Burma.

VAR. Scortechinii, King, bases of leaves rounded, main nerves 9-12 pairs; racemes less than half the length of the leaves; flowers 25 in. in diam.; stamens 30-40, fruit about 6 in. long.

PERAK; Scortechini 1782; King's Collector 5638.

This variety may possibly prove to be a distinct species. Although differing from the Andamanese and Burmese specimens in the points noted above, the Perak specimens have the same general facies.

#### 4. Pygeum, Gærtn.

Evergreen trees or shrubs. Leaves alternate, usually quite entire; stipules minute, fugacious, (large and persistent in one species) basal glands 2 or 0. Flowers small, racemose or paniculate, sometimes unisexual by want of the ovary. Calyx-tube obconic urceolate or campanulate, deciduous; limb 5-15-toothed, often unequally. Petals minute, 5-6 in the 5-6-toothed calyx, 0 in the 10-15-toothed, villous or tomentose, rarely glabrous, often undistinguishable from the calyx-lobes. Stamens 10-50, in one or more series at the orifice of the calyx-tube; filaments slender, incurved; anthers small. Carpel 1, basal in the calyx-tube, ovoid or subglobose; style terminal, slender, exserted from the bud, stigma capitate; ovules 2, collateral, pendulous. Fruit a transversely oblong, obscurely didymous, rarely subglobose drupe; pericarp thin, dry or juicy. Cotyledons very thick, hemispheric; radicle minute, superior. Distrib. Species about 30, tropical Asiatic and one African.

Edges of leaves entire :-Stipules large and persistent 1. P. stipulaceum. Stipules small and fugaceous :-Flowers '5 in, in diam. 2. P. grandiflorum. Flowers much less than 5 in. in diam. :-Ovary glabrous :-Racemes not much longer than the petioles :-Leaves 4 or 5 in. long and 2 in. broad, lower surface puberulous; main nerves 7 pairs ... 3. P. intermedium. Leaves 1.5-2 in. long and '65-1'1 in. broad, lower surface deciduously pubescent and rugulose beneath; main nerves 4-6 pairs ... 4. P. Maingayi. Leaves 3-35 in. long, 1-14 in. broad, glabrous beneath and subglaucous; main nerves 4 or 5

... 5. P. lanceolatum.

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Racemes 2 or 3 inches long : Flowers 15 in. long, 6-merous, stamens 30;		
leaves with 6 or 7 pairs of nerves, their apices		E Tor
	6.	P. acuminatum.
Flowers 25 in. long, 5-merous; stamens 40 or	٠.	2,000,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
50; leaves with 7-10 pairs of nerves, their apices		
	7	P. polystachyum.
Overy villous or hirsute:—	1.	1. pocystacregame.
Racemes much longer than the petioles (from '75-		
1.5 in. long):—		
•,	0	P. Scortechinii.
	0.	r. Scoriechians.
Leaves rugulose, the lower surface glabrous	•	
except for a few scattered adpressed hairs	9.	P. persimite.
Leaves with short adpressed hairs on the lower		_
surface, not glabrous or rugulose	10.	P. parvistorum.
Racemes very little longer than the petioles:-		
Lower surfaces of leaves with short adpressed		
hairs; bases of leaves cuneate, their apices		
caudate-acuminate	10.	P. parviflorum.
		VAR. densa.
Lower surfaces of leaves minutely pubescent		
with adpressed bristles intermixed with the		
hairs; bases of leaves rounded, their apices		
obtuse and emarginate	11.	P. ovalifolium.
Lower surfaces of leaves minutely rusty-pubes-		
cent, the hairs partly deciduous; leaves with		
rounded bases and acuminate apices	12.	P. Hookerianum
Leaves glabrous on the under surface	13.	P. brevifolium.
ges of leaves sinuate-dentate	14.	P. Griffithii.

PYGEUM STIPULACEUM, King n. sp. A tree; young branches stout, densely rusty-tomentose. Leaves very coriaceous, elliptic, acute, the base broad and slightly cordate, the edges revolute; upper surface glabrous, the nerves and midrib deeply depressed, the latter pubescent; lower surface rusty-pubescent especially on the midrib, main and transverse nerves; main-nerves 10-12 pairs, spreading, curving upwards; length 5-7 in., breadth 2.5-3.75 in., petiole 5 in., very stout and densely rusty-tomentose; stipules persistent, broadly ovate, or caudate, acute, boldly ribbed, puberulous, persistent. Racemes in fascicles from the branches below the leaves, 1.25-2 in. long, rustytomentose; bracts broadly elliptic, concave, tomentose outside, glabrous inside. Flowers 15 in. long, on pedicels about as long as themselves. Calyx-tube campanulate, with 10 short obtuse teeth, tomentose outside. Petals 0. Stamens about 15, exserted, glabrous. Pistil longer than the stamens; ovary villous; style stout, erect, subglabrous; stigma capitate, Fruit unknown. discoid.

PERAK; Scortechini 11020.

2. Pygeum grandiflorum, King n. spec. A tree 50-70 feet high; all parts, except the inflorescence, glabrous; young branches rather stout. Leaves thinly coriaceous, elliptic to oblong-elliptic, sometimes slightly obovate, with an abrupt short blunt point; the base cuneate, eglandular; upper surface shining, smooth, the lower less shining and minutely pustulate; main nerves 8 or 9 pairs, spreading but curving upwards, prominent on the lower surface; length 5-8 in., breadth 2.75-3.5 in., petiole .75 in. Panicles solitary, axillary, nearly as long as the leaves, with a few lax corymbose branches, almost glabrous below, rusty-tomentose towards the apex; bracts broadly ovate, concave, blunt, puberulous. Flowers 5 in. across, on pedicels 15 in. long; bracteoles near the apex of the pedicels 1 or 2, minute. Calyx-tube widely campanulate, short, with 5 broad blunt subreniform lobes tomentose outside. Petals 5, much larger than the calyx-teeth (2 in. long), subrotund to broadly oblong, blunt, reflexed. Stamens very numerous, glabrous. Pistil slightly longer than the stamens, the ovary pubescent, style puberulous; stigma small, capitate. Fruit unknown.

PERAK; King's Collector 7425.

A very distinct species with large glabrous leaves, and larger flowers than any here described.

3. Pygeum intermedium, King n. spec. A tree 30-40 feet high; young branches dark-coloured, lenticellate, subglabrous. Leaves coriaceous, broadly elliptic to oblong-elliptic, the apex acute or shortly acuminate, the base rounded or slightly cuneate; upper surface minutely punctulate, not shining when dry, glabrous except the broad, depressed, pubescent midrib; lower surface puberulous, pubescent on the nerves and midrib; main-nerves 7 pairs, oblique, curved, prominent beneath; length 4-5 in., breadth about 2 in., petiole 35 in. Racemes about 5 in. long, from the axils of fallen leaves, solitary or several together, densely tawny-tomentose; bracts shorter than the very short pedicels, ovate-obtuse, concave. Flowers less than 15 in. long. Calyx-tube widely infundibuliform, with 6 oblong blunt hairy teeth. Petals none. Stamens about 20, glabrous, exserted. Pistils as long as the stamens, glabrous; stigma capitate. Fruit subglobular, compressed, crowned by the style, glabrous, '3 in. long and about '2 in. thick.

Malacca; Maingay 626. PERAK; King's Collector 3791.

4. PYGEUM MAINGAYI, Hook. fil. Fl. Br. Ind. II, 319. A tree; young branches slender, with dark-coloured glabrous bark. Leares coriaceous, elliptic-lanceolate, acuminate, with slightly cuneate rather broad bases and often with 2 small glands a little above the petiole; the upper surface glabrous, smooth but not shining (when dry); the lower dark-brown in colour and rugulose, deciduously pubescent: main-nerves

4-6 pairs, spreading, curving upwards, rather prominent on the lower, obsolete on the upper surface; length 1·5-2 in., breadth ·65-1·1 in., petiole ·2 in. Racemes axillary and extra-axillary, about as long as the petioles, rusty-tomentose; bracts solitary at the base of the pedicels, ovate-acute, concave, tomentose outside, glabrous inside. Flowers ·15 in. in diam., on pedicels shorter than themselves. Calyx-tube funnel-shaped, its mouth with 6 obtuse villous teeth. Petals none. Stamens about 16, glabrous, much exserted. Ovary small, often abortive; style slender, glabrous. Fruit transversely oblong with a sharp mucronate apex, ·25 in. long, and ·35 in. broad.

Malacca; Maingay 625. Perak; King's Collector 5336; Scortechini 217.

This species comes very near P. lanceolatum, Hook fil. It has, however, no petals, whereas P. lanceolatum has. The leaves of this in the young state are moreover pubescent, while those of the latter are glabrous at all stages.

5. Pygeum lanceolatum, Hook. fil. Fl. Br. Ind. II, 319. A tree 30 or 40 feet high; young branches slender, dark-coloured, adpressedpuberulous. Leaves thinly coriaceous, elliptic-lanceolate, obtusely acuminate; the base cuneate, with 2 narrow glands just above it; both surfaces glabrous, the lower subglaucous and with a few adpressed hairs on the main nerves and midrib; main nerves 4 or 5 pairs, curved, ascending, slightly prominent and dark-coloured on the lower surface; length 3-3.5 in., breadth 1-1.4 in., petiole 25-3 in. Racemes only about 5 in. long, axillary and extra-axillary, tomentose; the bracteole at the base of each pedicel sub-orbicular, acute, glabrous inside. Flowers on pedicels as long as themselves, 15 in. in diam. Calyxtube widely campanulate, tomentose externally, glabrous inside and with 10 broad short teeth. Petals (if any) deciduous. Stamens about 20, much exserted. Ovary glabrous, compressed; style stout, glabrous, longer than the petals; stigma compressed. Fruit transversely oblong, with a slight vertical groove, glabrous, 3 in. long, and 4 in. broad, 2seeded.

SINGAPORE; Lobb 328. PENANG; Curtis 216, 735.

The racemes of this are often very short, almost sessile, and subglobular. It is a very distinct species. I have not been able to discover any petals.

6. Pygeum acuminatum, Colebr. in Trans, Linn. Soc. XII, 360, t. 18. A tall tree; young branches cinereous, glabrous, rough. Leaves coriaceous, elliptic to elliptic-oblong, shortly and obtusely caudate-acuminate; the base rounded or slightly cuneate and unequal, often with 1 or 2 obscure glands; upper surface glabrous, shining, the midrib and nerves depressed; lower surface brown when dry, subrugulose, glabrous, dull; main nerves 6 or 7 pairs, curving upwards, prominent (almost winged)

beneath; length 4-6.5 in., breadth 1.75-3.25 in., petiole .35-5 in. Racemes from the axils of fallen leaves, solitary or several together, 2 or 3 inches long, slender, tawny-pubescent. Flowers .15 in. long, on pedicels .1 in. long; bracts narrowly oblong, sub-acute, very deciduous. Calya-tube broadly campanulate, .15 in. wide at the mouth; teeth about 6, narrowly lanceolate. Petals 6, oblanceolate, obtuse, sericeous outside. Stamens about 30, long-exserted, glabrous. Pistil as long as the stamens; ovary glabrous; style slender, straight; stigma discoid-capitate. Fruit transversely oblong, slightly compressed, minutely apiculate, glabrous, but slightly rough, .5 in. long and .8 in. broad.

Andaman Islands. Distrib. Burma, Chittagong, Assam Range, Eastern Tropical Himalaya.

7. PYGEUM POLYSTACHYUM, Hook. fil. Fl. Br. Ind. I, 320. A tree 30-60 feet high; young branches with dark-coloured glabrous leuticellate bark. Leaves very corraceous, elliptic-oblong, usually with an abrupt obtusely acuminate apex; the base broad or slightly and suddenly cuneate and with 2 large thick glands on its upper surface just above the petiole; upper surface glabrous, shining, pale greenish-brown when dry; the lower brown when dry, dull, minutely rugulose, glabrous; main nerves 7-10 pairs, oblique, rather straight, depressed on the upper and prominent on the lower surface; length 4.5-7 in., breadth 2.5-4 in., petiole '5 in., stout. Racemes (occasionally racemoid panicles) axillary, shorter than the leaves, slender, covered with short scanty rusty pubescence. Flowers about 2 in. long and 25 in, in diam., on pedicels varying from '1-2 in, long; bracts (if any) deciduous. Calyx-tube campanulate, ribbed and tomentose externally, glabrescent within; lobes 5, oblong, obtuse, rufous-tomentose. Petals 5, like the calyx-lobes. Stamens 40-50, much exserted. Ovary glabrous; style as long as the stamens, glabrous; stigma dilated, compressed laterally. Drupe sub-globular or transversely oblong, bluntly apiculate, '65 in. long and from '6-75 in. broad, glabrous. Seeds glaucous.

Malacca; Maingay 627. SINGAPORE; Ridley 3830, 4453, 4666. Perak; Scortechini 2045, 2063. King's Collector 5676, 6603, 5676, 6847, 10942; Wray 3113, 3384.

This species is very near P. acuminatum, Colebr., of which I believe it to be probably only a southern form.

8. Pygeum Scortechini, King n. sp. A slender tree 40-50 feet high; young branches puberulous, the bark dark-coloured. Leaves coriaceous, elliptic to oblong-lanceolate, acute or shortly acuminate; the base cuneate, eglacdular; upper surface shining, glabrous except for occasionally a few scattered hairs on the depressed midrib near its base; lower surface pale, not shining, glabrous, minutely rugulose; main nerves 290

6 or 7 pairs, slender, spreading; length 2-3 in., breadth ·8-1·35 in., petiole ·25-·35 in. Racemes solitary, axillary, 1-1·25 in. long, coarsely adpressed rusty-pubescent, bracts (if any) deciduous. Flowers ·15 in. long, their pedicels ·1 in. Calyx-tube narrowly campanulate, with 6 oblong subacute hirsute lobes. Petals none. Stamens about 12, exserted. Pistil shorter than the stamens, ovary with long white hairs; style glabrescent. Fruit transversely oblong, glabrous, minutely pubescent, ·3 in. long and ·4 in. broad.

PERAK; Scortechini 357.

9. Pygeum persimile, Kurz in Journ. As. Soc. Bengal Vol. XLI, A tree; young branches slender, deciduously rusty-pubescent. Leaves thinly coriaceous, elliptic to elliptic-lanceolate, shortly and obtusely acuminate; the base rounded or slightly cuneate, eglandular; upper surface glabrous or glabrescent, very minutely punctate, dull, the midrib coarsely pubescent; lower surface brown, rugulose, with few scattered adpressed bristles, the nerves (but especially the midrib) strigose-pubescent; main nerves 7 or 8 pairs, spreading, very prominent (almost winged) on the lower surface; length 2.5-4 in., breadth 1.3-1.6 in.; petiole .25-3 in., slender, pubescent. Racemes usually in fascicles of 2 or 3 (sometimes united near the base), rarely solitary, from above the scars of fallen leaves, '75-1'75 in. long, densely tawnytomentose; bracts broadly ovate, acute or obtuse, longer than the pedicels. Flowers 1 in. long and 15 in. wide at the mouth, their pedicels less than 'l in. Calyx-tube campanulate, tomentose outside, glabrous inside. the mouth with 6 distant obtuse teeth. Petals none. Stamens about 12 or 18, glabrous, spreading, exserted. Pistil erect, as long as the stamens, the ovary tawny-sericeous; the style glabrous above, sericeous below; stigma obliquely discoid. Fruit transversely oblong, with a deep vertical groove, scarcely apiculate, glabrous except for a few adpressed hairs in the groove, '25 in. long and '35 in. broad. Kurz For. Flora Burma, I, 436; Hook. fil. Fl. Br. Ind. II, 320.

MALACCA; Griffith. SINGAPORE; Ridley 4452.

Mr. Kurz inadvertently referred to this Griffith's No. 2056 from Tenasserim which he says is closely allied to P. Lampongum, Miq. In my own opinion Griffith's No. 2056 is P. Lampongum. Kurz's description of his P. persimile exactly agrees with Griffithian specimens from Malacca (without any number), and on some of these he has written the name P. persimile with his own hand. This species must therefore henceforth be considered as Malayan and not as Burmese.

10. Pygeum parviflorum, Teysm. & Binn. in Nat. Tijds. Ned. Ind. II, 309. A tree 50-70 feet high; young branches dark-coloured, minutely rusty-pubescent. *Leaves* coriaceous, elliptic to elliptic-oblong, shortly caudate-acuminate, the base cuneate, upper surface shining,

glabrous except sometimes the midrib pubescent; lower surface with sparse short adpressed hairs, the midrib and main nerves pubescent: main nerves 5 or 6 pairs, oblique, not curved, very prominent on the lower, faint on the upper surface; length 2.5-3.5 in., breadth 1.5-2 in., petiole 3-4 in. Racemes from 85-15 in. long, solitary or several together from the axils of fallen leaves, tomentose; bracts broad, obtuse, tomentose, (subglabrous in VAR. densa). Flowers 1 in. long, sub-sessile. Calyx-tube campanulate, with 6 obtuse short villous teeth. Stamens about 18, exserted, glabrous. Pistil as long as the stamens, ovary villous. Style sparsely pubescent especially towards the base; stigma capitate. discoid, grooved. Fruit slightly broader than long, compressed, sparsely adpressed-pubescent, subglabrous when old, 25 in. long and 3 in. broad. Mig. Flor. Ind. Bat. Vol. I, pt. I, 361; Hook. fil. Fl. Br. Ind. II, 320. P. arboreum, Endl. Gen. Pl. 1250, in part. Polydontia arborea, Blume Bijdr. 1105. Polystorthia, Blume Fl. Javae Praef. VIII, in part.

MALACCA; Ridley 1872. PENANG; Curtis 162. PERAK; King's Collector 7236, and 10827; Curtis 1293. DISTRIB. Java, Borneo.

VAR. densa; racemes not much longer than the petioles, the flowers much crowded and quite sessile, densely covered with pale tomentum; bracts very broad, subglabrous.

PERAK; King's Collector 6986, 10195, 10396, 10753.

It is possible that this variety ought to be treated as a species.

11. Pygeum ovalifolium, King n. spec. A small tree 15-20 feet high; young branches with rather rough cinereous bark, deciduously rustypubescent. Leaves oval or broadly ovate; the apex obtuse, obliquely and minutely emarginate; the base rounded and eglandular; upper surface shining, minutely punctate and rugulose, the midrib convex and rustypubescent; lower surface dull, minutely pubescent, with adpressed bristles intermixed, the midrib tomentose; main nerves 7 or 8 pairs, spreading, slightly depressed on the upper and slightly prominent on the lower surface when dry; length 1.75-2.15 in., breadth 1-1.5 in., petiole 3-4 in. Racemes axillary, stout, from 3-5in. long, few-flowersed, densely rusty-tomentose; bracts obliquely ovate, very concave, glabrous inside, densely tomentose outside. Flowers 2 in. long, and 3 in. wide at the mouth, sessile. Calyx-tube campanulate, densely tomentose outside, glabrous inside except at the base; the mouth with 10 oblong obtuse teeth. Petals none. Stamens about 30 or 40, glabrous, much exserted, spreading. Pistil shorter than the stamens; the ovary narrowly ovoid, sericeous; style stout, subglabrous; stigma obliquely discoid. Fruit subglobose with a slight vertical groove and shortly apiculate apex, sparsely strigose, 35 in. in diam.

Perak; at an elevation of about 5000 feet, King's Collector 7329.

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12. Pygeum Hookerianum, King n. spec. A shrub or small tree; young branches dark-coloured, glabrous. Leaves thinly coriaceous, more or less broadly ovate, sometimes ovate-oblong, shortly acuminate, the base broad and rounded or sometimes slightly narrowed to the petiole; upper surface glabrous, the lower minutely rusty-pubescent especially on the midrib and nerves, the hairs partially deciduous; main nerves 6 or 7 pairs, spreading, slightly oblique, interarching rather far from the edge; length 2-4 in., breadth 1-18 in., petiole 25 in. Racemes axillary and extra-axillary, sometimes crowded, usually less than 5 in. long, densely rufous-tomentose. Flowers 2 in, in diam., on very short pedicels each with a broadly ovate concave bracteole at its base. Calyx-tube tomentose outside, glabrous inside, widely campanulate, with 6 obtuse teeth. Petals 6, about as long as the calyx-teeth, lanceolate, pubescent externally. Stamens from the mouth of the calyx-tube, about 20, glabrous, much exserted. Ovary sericeous; style longer than the stamens, puberulous, stigma obliquely discoid. Fruit sub-globular, 1seeded and 25 in. in diam., or transversely elongate with a shallow vertical groove and often 2-seeded, '25 in. long and '4 in. broad, always glabrous and slightly apiculate, black or dark purple; seed when ripe covered with white down.

Perak; Scortechini 1234; Wray 3969; King's Collector 1970, 2083, 2753, 4789, 6425.

To this species I believe belongs No. 628 of the Maingay Herbarium referred to by Sir Joseph Hooker in a note on p. 322, Vol. II of the Flora of British India, but left undescribed by him for want of sufficiently good material.

13. Pygeum brevifolium, Hook. fil. Fl. Br. Ind. II, 321. A shrub 3 or 4 feet high; young branches dark-coloured, glabrous. Leaves coriaceous, broadly oblong, shortly and obtusely acuminate, sometimes minutely emarginate, both surfaces quite glabrous; the upper olivaceous brown, the lower brown; main nerves 4 or 5 pairs, spreading and interarching, faint beneath; length 2-2.5 in., breadth 1·1-1·3 in., petiole ·25-3 in. Racemes axillary, only about ·3 in. long, sub-globose, tomentose, 6-10-flowered, bracts small. Calyx-tube urceolate, with 5 or 6 obtuse unequal teeth. Petals none. Stamens 10-16, filaments short. Ovary villous; style rather short, glabrous. Fruit unknown.

MALACCA; Summit of Mount Ophir, Griffith 2051.

14. Pygeum Griffithi, Hook, fil. Fl. Br. Ind. II, 322. A tree? Young branches stout, densely tomentose. Leaves coriaceous, oblong or oblong-lanceolate, obtuse or obtusely cuspidate; the edges ciliate and obscurely sinuate-toothed; the base rounded or acute, with 2 small basal glands; both surfaces very minutely dotted; the upper glabrous, the midrib and main nerves impressed and puberulous; lower

surface minutely puberulous; main nerves 8-10 pairs, spreading, interarching; length 5 or 6 in; petiole 2 in., very stout. Racemes axillary, solitary, stout, 5 in. long, few-flowered, densely tomentose. Flowers sessile. Calyx-tube obconic, with 6 oblong teeth. Petals none. Stamens 12. Ovary globose, hairy. Fruit unknown.

MALACCA; Griffith 2050.

This species is very imperfectly known, the only specimens of it being Griffith's which are quite fragmentary. The above description is taken entirely from Sir Joseph Hooker, who in turn took the description of the flowers from Griffith's MSS. It may be distinguished by its sinuate-toothed leaves.

### 5. RUBUS, Linn.

Sub-erect or sarmentose shrubs, always prickly. Leaves alternate, simple or compound; stipules free or adnate to the petiole. Flowers in terminal and axillary corymbose panicles, rarely solitary, white or red. Calyx-tube broad; lobes 5, persistent. Petals 5. Stamens many. Disc lining the calyx-tube. Carpels many, on a convex receptacle; style subterminal; ovules 2, collateral, pendulous. Drupes many, 1-seeded, crowded upon a dry or spongy conical or cylindric receptacle. Seed pendulous. Distrib. Abundant in the northern hemisphere, rare in the southern; species about 200.

Leaves simple :-

Leaves palmately 5-7-lobed; terminal panicle shorter than the leaves; young branches tomentose, woolly or villous. ... ... ... ... ... ... ... ... 1. R. moluccanus. Leaves ovate or ovate-triangular, with 2 or 4 shallow lobes at the base only; terminal panicle as long as the leaves; young branches with thin cobwebby pubescence. Leaves broadly ovate, not lobed; terminal panicle much longer than the leaves; young branches puberulous at first but speedily glabrous ... ... 3. R. elongatus. Leaves pinnate ... ... 4. R. rosæfolius.

1. Rubus moluccanus, Linn. Spec. Pl. 707. A powerful subscandent shrub; the young branches, under surfaces of the leaves and inflorescence densely tawny or rusty-tomentose, villous or woolly; prickles short (1 in. or less) and recurved on the branches, petioles and lower surfaces of the midribs, often absent on the main nerves. Leaves coriaceous, usually broader than long, broadly ovate or orbicular, deeply cordate; palmately 5-7-lobed, the lobes often lobulate; 2-10 in. in diam., the petioles 1-2-5 in long; upper surfaces of leaves rugulose, sparsely hispid, the edges irregularly dentate or serrate. Stipules varying in size, oblong, toothed, pinnatifid or laciniate. Panicles axillary and terminal, much shorter than the leaves, few-flowered. Flowers from 5-1 in. in diam., bracts like the stipules not with glandular hairs. Calyx-

lobes '2-4 in. long, more or less triangular, sometimes deeply toothed. Petals obovate, white, shorter than the calyx-lobes; ovaries numerous, glabrous. Fruit globose, succulent, the individual carpels red, the receptacle hairy. Roxb. Flor. Ind. II, 518; Miq. Flor. Ind. Bat. I, part 1, 382; Wall. Cat. 743; Kurz For. Flor. Brit. Burm. I, 437. R. rugosus, Smith in Rees Cyc. XXX, Rubus 34; Don Prodr. 234; Wight et Arn. Prodr. 299; Dalz. & Gibs. Bomb. Flor. 89; Thwaites' Enum. 101; Wight Ic. t. 225; Wall. Cat. 748. Rubus Hamiltonianus, Wall. Plant. As. Rar. III, 19, t. 234. R. micropetalus, R. macrocarpus, and R. Fairholmianus, Gardner in Calc. Journ. Nat. Hist. VIII, 6. R. cordifolius, Don Prodr. 233. R. reflexus, Ker in Bot. Reg. 461; Benth. Hong-Kong Flor. 104. R. Hamiltonianus, Seringe in DC. Prodr. II, 566. Rumph. Amboin. V, 88, t. 47, f. 2.

In all the Provinces except the Andaman and Nicobar Islands; common on the hilly parts. DISTRIB. British India, Malayan Archipelago.

Var. alceæfolia; pubescence very soft and velvety, leaves 4·5-10 in. in diam., prickles often ·2 or ·25 in. long, stipules and bracts pectinate, terminal panicle often 6 in. long, calyx-teeth spreading. R. alceæfolius, Poir. Encycl. VI, 247; Miq. Fl. Ind. Bat. Vol. I, Pt. 1, 379.

Perak; elevation 2000 feet, Wray 1463. DISTRIB. Malay Archi-

pelago.

2. Rubus glomeratus, Blume Bijdr. 1111. A semi-scandent shrub; young branches slender, with pale deciduous cobwebby pubescence. Leaves thinly coriaceous, ovate or ovate-triangular, with 2-4 shallow lobes near the cordate base only, the upper half tapering to the acuminate apex, not lobed, the edges everywhere dentate; upper surface glabrous except the pale-pubescent midrib and sometimes the nerves, minutely rugulose; lower surface minutely rusty- or tawny-tomentose or sparsely pubescent, reticulate; length 3-4 in., breadth 1.75-2.5 in.; petiole 1-1.5 in. long, with minute prickles which extend sometimes to the midrib. Stipules ovate, pinnatifid, deciduous. Panicles axillary and shorter than the leaves, or terminal and as long as the leaves, fewflowered, tawny-tomentose. Flowers 35 in. in diam. Calyx-lobes triangular, entire, acute, tomentose. Petals as long as the calyx-lobes, obovate. Carpels of the fruit numerous, red. R. Hasskarlii, Miq. Flor. Ind. Bat. Vol. I, Pt. 1, 381. R. acerifolius, Wall. Cat. 744.

PENANG; SINGAPORE; PERAK. DISTRIB. Malay Archipelago.

VAR. gracilis, King; terminal panicles twice as long as the leaves; pedicels of the flowers 4-6 in. long.

In its long terminal panicles this variety resembles R, elongatus, but the flowers have longer pedicels; moreover the venation of the leaves is quite that of R, glomeratus.

3. Rubus elongatus, Smith Icon. Ined. III, t. 62. A scandent

shrub: young branches at first pubescent but speedily glabrous, the bark dark-coloured and with minute deflexed prickles. Leaves coriaceous. broadly ovate, deeply cordate at the base, the apex acute; the edges sinuate and remotely dentate, not lobed; upper surface smooth, glabrous except the pubescent midrib; under surface pale, and (except 3 or 4 on the midrib) without prickles; the nerves and veins glabrous and chestnut-brown, the areolæ minutely pale-tomentose; length 3.5-5.5 in., breadth 2.5-3.5 in., petiole 1.35-2 in., with a few small prickles. Stipules ovate, pinnatifid, deciduous. Panicles pubescent and with small scattered prickles, a few axillary and shorter than or as long as the leaves; the terminal one much longer than the leaves (often 15 in. long) with distant branches; the flowers mostly clustered at their extremities, subsessile or shortly pedicelled, 3 in. in diam. Calux-lobes triangular, blunt, tawny-tomentose. Fruit with numerous red carpels. DC. Prodr. II, 567; Blume Bijdr. 1112. R. Lobbianus, Hook. Ic. Pl. t. 741-742.

PERAK; Wray 421, 1849; King's Collector 3465, 5732; Scortechini 1468. DISTRIB. Sumatra.

4. Rubus Rosaefolius, Smith Ic. Ined. III, t. 60. A subscandent woody shrub; branches, petioles leaf-rachises and inflorescence with long stiff usually glandular hairs, with shorter softer hairs intermixed and a few sharp polished hooked spines. Leaves pinnate, 2-5 in. long; leaflets 3-7, membranous, lanceolate or ovate-lanceolate, unequally incisedserrate, rarely with 1 or 2 basal lobes, the apex acuminate, the base rounded; upper surface sparsely strigose, the midrib and nerves villous; lower surface less strigose than the upper, minutely reticulate, never white or glaucous; length of leaflets 1-3 in., breadth 35-12 in.; petiolules of the lateral leaflets 1-2 in., those of the terminal ones 5-1 in. Stipules linear-lanceolate, acuminate. Flowers '75-1 in. in diam., on pedicels much longer than themselves, solitary or in lax few-flowered Calyx-lobes lanceolate, acuminate, not prickly, woolly or glabrous. Petals usually larger than the calvx-lobes, broadly obovate, white. Fruit elongated, rarely subglobose, the numerous red carpels on a glabrous receptacle. Roxb. Flor. Ind. II, 518; Wall. Cat. 728; Kurz For. Flora Brit. Burm. I, 439; Hook. Ic. Pl. t. 349; Hook. fil. Fl. Br. Ind. II, 341. R. pinnatus, Willd. R. asper, Don Prodr. 234; Wall. Cat. 741.

PERAK; at 3900 feet. Wray, at 4500 feet, No. 4187. DISTRIB. British India, Java.

### 6. PYRUS, Linn.

Trees or shrnbs. Leaves deciduous, simple or pinnate; stipules deciduous. Flowers white red or pink, in terminal cymes or corymbs; bracts subulate or linear. Calyx-tube urceolate turbinate or obconic, 296

lobes 5, erect or reflexed, persistent or deciduous. Petals 5, quincuncially imbricate in bud. Stamens 20 or more, filaments sometimes connate at the base. Disc annular, or lining the calyx-tube. Carpels 2-5, connate and adnate to the calyx-tube; styles 2-5, free or connate below, stigmas truncate; ovules 2 in each cell, basal, collateral, ascending. Fruit (a pome) fleshy, 2-5-celled; cells with a membranous or cartilaginous often 2-valved endocarp, I-2-seeded. Seeds when in pairs planoconvex, testa coriaceous; cotyledons amygdaloid. Distrie. N. temp. and cold regions; species about 100.

Pyrus granulosa, Bertol. in Mem. Acad. Sc. Bolog. Ser. II, IV, 312. A small glabrous tree. Leaves coriaceous, ovate, usually acuminate, the base cureate or rounded, the edges serrate or sinuate-serrate; upper surface shining, the lower dull-brown when dry; main nerves 7-9 pairs, prominent on the lower surface, oblique. Fruits globose-pyriform, minutely ragulose, glabrous, the calyx-lobes not persistent, 75 in. long and 6 in. in diam., 4-celled, in lax terminal glabrous corymbs longer than the leaves; fruit pedicels from 4-15 in. long, endocarp of large granules. Hook. fil. Fl. Br. Ind. II, 378. P. sikhimensis, Wenzig in Linnæa, 1874, 58, in part; Kurz For. Flor. Brit. Burm. I, 442. P. Karensium, Kurz in Journ. As. Soc. Beng. 1872, II, 306; 1873, II, 232.

PERAK; at an elevation of 2000-2500 feet; Scortechini. DISTRIB. Burma; Khasia Mountains; Sumatra, Forbes 2050! 2376.

#### ORDER XL. SAXIFRAGACEÆ.

Trees shrubs or herbs. Leaves alternate and exstipulate, or stipules adnate to the base of the petiole, or opposite and exstipulate. Influrescence various; flowers hermaphrodite or polygamo diocious; the sepals, petals and stamens symmetrically regular. Calyx more or less adnate to the ovary, sometimes nearly free, sometimes quite inferior; lobes imbricate or valvate. Petals 5 or 4, rarely 0, perigynous or epigynous, rarely sub-hypogynous, imbricate or valvate. Stamens inserted with the petals, equalling or double their number, rarely numerous. Ovary of 2 or 3-5 united carpels; usually 2- or 3-5-celled with axile placentas, occasionally 1-celled with parietal placentas; styles as many as the carpels, distinct or combined nearly to the summits, stigmas capitate or lateral and subcapitate; ovules numerous, anatropous, erect or pendulous. Fruit capsular or berried. Seeds numerous or several (solitary in Polyosma) albuminous; the albumen rarely scanty or nearly wanting. DISTRIB. Species 580; in the cold or temperate regions of the whole world and in the mountains of the tropics; together with a few genera of tropical trees:

A sub-herbaceous shrub, with simple exstipulate leaves, and succulent fruits with numerous small seeds DICHROA. Woody shrubs or trees with pinnate (rarely simple) stipulate leaves; fruits small, dry, capsular, dehiscent, 2-celled; seeds few hairy WEINMANNIA. Trees or large woody shrubs with simple leaves, 4-merous flowers, and dry fruit with a single large smooth seed POLYOSMA.

### I. DICHROA, Lour.

A sub-herbaceous shrub. Leaves opposite, more or less serrate, lanceolate, persitent, exstipulate. Panicle terminal. Calyx-tube adnate to the ovary; limb 5-6-toothed. Petals 5 or 6, thick, valvate, blue or purplish. Stamens 10 or 12, epigynous. Ovary \(\frac{3}{4}\)-inferior, 1-celled; styles 3-5; ovules numerous, on 3-5 parietal placentas formed by the inflexed margins of the carpels. Berry 3-inferior, blue. Seeds numerous, small, obovoid; testa with large reticulations.

DICHROA FEBRIFUGA, Lour. Fl. Cochinch, 301. A shrub 3-6 feet high; branches terete, nearly glabrous. Leaves membranous, caudateacuminate, the base cuneate, the edges more or less distinctly serrate in the upper three-fourths, entire in the lower fourth; main nerves 8 or 9 pairs, ascending; length 4-5 in., breadth 1.4-1.8 in.; petioles unequal, from 6-1.75 in. Panicles adpressed-pubescent. Hook. fil. Fl. Br. Ind. II, 406; Benth. Fl. Hongk. 128; Maxim. in Mem. Acad. Petersb. X 16, p. 2. D. eyanitis and D. latifolia, Miq. Fl. Ind. Bat. I, 721, 722. Adamia versicolor, Fortune in Journ. Hort. Soc. I, 298; Lindl. & Paxt. Fl. Gard. I, t. 5. A. cyanea, Wall. Cat. 441; Tent. Fl. Nep. t. 36; Pl. As. Rar. t. 213; Bot. Mag. t. 3046; DC. Prodr. IV, 16; H. f. & T. in Journ. Linn. Soc. II, 76. A. chinensis, Gardn. & Champ. in Kew Journ. Bot. I, 311. Cyanitis sylvatica, Reinw. in Blume Bijd. 921; DC. Prodr. IV, 16.

Perak; on the Central Range; Scortechini 266. DISTRIB. On the higher parts of the Malayan Archipelago; China; Philippines; Temperate Himalaya from Bhotan to Nepal; Khasia Mountains.

# WEINMANNIA, Linn.

late, opposite, coriaceous, unequally pinnate, 3-foliolate or simple, leaflets usually glandular-serrate. Flowers hermaphrodite or polygamodiœceous. Calyx-tube short, the lobes 4 or 5, imbricate, persistent or deciduous. Petals 4 or 5, sessile, imbricate, spathulate or obovate, inserted under the lobed margin of the perigynous disc. Stamens 8 or 10, inserted with the petals, the filaments often elongated and exserted; the anthers small, 2-celled. Ovary free, ovoid or conical, 2-celled, 2-beaked;

styles 2, subulate, persistent, the stigmas simple. Capsule small, coriaceous, 2-celled, septicidally 2-valved, the valves bont-shaped, few-or many-seeded. Seeds oblong, reniform or subglobose; the testa membranous, often hairy. Embryo terete, in the axis, or towards the apex, of the fleshy albumen. Distrib. Species about 80; Malayan, Mascarene, Australasian, and American.

Weinmannia Blumer, Planch. in Hook. Lond. Journ. Bot. Vol. 6, (1847), p. 470. A small tree; young branches with sparse black stiff hairs and many lenticels. Stipules obovate-rotund, adpressed-pubescent, 2 in. in diam. Leaves 2-3.5 in. long, pinnate; leaflets 9-11, opposite, sessile, narrowly oblong-lanceolate with acute apices and slightly narrowed and oblique bases, their edges remotely glandular-serrate, the upper surfaces glabrous, the lower glabrous but for a very few scattered black hairs; main nerves 6 or 7 pairs, dark-coloured; length 175-1 in., the terminal one longer, breadth 2-3 in. Racemes clustered at the apices of the branches, about as long as the leaves, puberulous, many-flowered. Flowers less than 1 in. long, their pedicels shorter. Capsules narrowly elliptic, glaberulous, crowned by the 2 divergent styles. Seeds elongated, very comose at one end, less so at the other. Miq. Fl. Ind. Bat. Vol. I, pt. 1, 718. Spirea pinnata, Blume, Cat. Hort. Bot. Bogor. Arnoldia pinnata, Blume Bijdr., 868.

MALACCA; on Mount Ophir, Griffith. PEBAK; on Gunong Bubu, at an elevation of 5000 feet, Wray 3814; on Gunong Idjan at 5000 feet, Scortechini 446.

## 3. Polyosma, Blume.

Evergreen trees or shrubs. Leaves opposite or subopposite, petioled, acute or acuminate. Flowers in terminal racemes (in some non-Indian species solitary) 3-bracteolate. Calyx-tube entirely adnate to the ovary; lobes 4, small, persistent. Petals 4, epigynous, linear, valvate, white, yellowish or greenish, much recurved when expanded, fugacious, usually hairy within. Stamens 4, epigynous, filaments hairy. Ovary inferior, 1-celled; style columnar, stigma simple; ovules numerous, ascending, on two parietal placentas which project considerably into the cavity of the ovary. Fruit sub-baccate, 1-seeded. Seed ascending, subbasal. Distrib. Species 18; Malayau, British Indian and tropical Australasian.

Leaves quite glabrous on both surfaces:—

Leaves sharply sinuate-dentate, membranous; flowers '2 in.

long '... ... ... ... 1. P. parvifora.

Leaves quite entire, coriaceous, flowers '3 or '35 in. long:—

Leaves elliptic to elliptic-rotand, or obovate; calyx strigose ... ... 2. P. coriacea.

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Leaves oblong or oblong-lanceolate, calyx nearly glabrous 3. P. Scortechinii. Leaves glabrous on the upper surface, the midrib and nerves. often with the intervening spaces on the lower surface also adpressed-pubescent :-Fruit truncate at the base and with 4 deep vertical grooves; flowers not more than 3 in. long; leaves entire 4. P. mutabilis. Fruit not truncate at the base and not vertically ridged :-Fruit subglobular; flowers 35 in. long; leaves entire ... 5. P. fragrans. Fruit ovoid, tapering at the base; flowers 45 in. long; leaves entire or remotely serrate ... 6. P. integrifolia. Leaves glabrous on the upper surface, the lower surface always in the young leaves, and usually in adult leaves covered with dense yellowish tomentum :-Fruit sub-globular, not ridged, '25 in. long 7. P. læte-virens. Fruit ovoid with a truncate base, and with 4 deep vertical ridges, '4 in. long 8. P. velutina. Imperfectly known species near P. velutina, Bl. ...

9. P. Ridleyi. 1. POLYOSMA PARVIFLORA, King n. spec. A small tree; young branches slender, glabrous. Leaves membranous, narrowly elliptic, shortly caudate-acuminate, the edges sinuate-dentate in the upper threefourths, entire in the lower fourth, the base cuneate; both surfaces glabrous, dull and dark-coloured when dry, the lower slightly paler than the upper; main nerves 10-12 pairs, sub-horizontal, slightly prominent on the lower surface only; length 2.5-3.25 in., breadth 1-1.5 in.; petiole 3-5 in., sparsely pubescent, channelled. Racemes terminal, shorter than the leaves, puberulous. Flowers 2 in. long, their pedicels '05 in., adpressed-pubescent; the bracteoles linear, longer than the pedicel. Calyx-tube narrow, nearly glabrous, the mouth with triangular acuminate teeth. Petals only twice as long as the calyx, linear, obtuse, pubescent externally, longer than the anthers. Fruit flaskshaped, the apex crowned by the calyx-teeth and the pointed base of the style, the base rounded and slightly gibbous, glabrous, 5 in. long, and 3 in. in diam.

PERAK; on Gunong Inas, at 5000 feet, Wray 4143.

A species somewhat resembling P. ilicifolia, Blume in the shape of its leaves; but having much shorter racemes and smaller flowers, and an almost glabrous calyx.

2. Polyosma coriacea, King n. spec. A shrub or small tree; young branches glabrous, sparsely lenticellate. Leaves coriaceous, elliptic to elliptic-rotund, rarely sub-obovate, the apex acute or shortly acuminate, the edges entire and slightly revolute when dry, the base cuneate; both surfaces glabrous, the upper shining, the lower dull and paler; main nerves 9-11 pairs, spreading, interarching freely, slightly prominent on the lower surface only; length 2.75-4 in., breadth 1.5-2 in., petiole about '75 in. Racemes terminal, about as long as or longer than 300

the leaves, sparsely adpressed-pubescent. Flowers 35 in. long; their pedicels 1 in., bearing 3 unequal linear-acuminate strigose bracteoles. Galyx-tube shorter than the pedicel, slightly constricted under the mouth; the teeth triangular, acute, strigose like the tube. Petals much longer than the calyx and slightly longer than the stamens, linear, obtuse, minutely strigose outside, sub-villous inside. Fruit (very young) ovoid, glabrous, crowned by the calyx-teeth.

PERAK; on Gunong Bubu at an elevation of 5000 feet; Scortechini 805; Wray 3819, 3855, 4131. Ridley's 5219 from Kedah Peak possibly belongs to this species. Its leaves, however, are thinner, and their nerves more distinct.

3. Polyosma Scorteginii, King n. spec. A medium-sized tree (fild Scortechini); young branches slender, with pale almost polished bark, all parts except the inflorescence glabrous. Leaves coriaceous, oblong or oblong-lanceolate, sometimes oblanceolate, acute, much narrowed to the base; the edges entire, slightly revolute when dry; both surfaces shining, glabrous, except sometimes a few hairs on the midrib beneath; main nerves 10-12 pairs, spreading, interarching, faint on both surfaces; length 4-6.5 in., breadth 1.5-2 in., petiole 35-6 in. winged. Racemes terminal, shorter than the leaves, sparsely puberulous. Flowers 3 in. long, their pedicels about 05 in.; the bracteoles small, lanceolate, hairy. Calyx-tube nearly glabrous; its lobes shallow, triangular. Petals linear, subacute, pubescent outside, only slightly so inside, about as long as the almost glabrous stamens. Fruit unknown. P. integrifolia, Herb. Scortechini (not of Blume).

PERAK; Scortechini 1900.

Readily distinguished by its perfectly glabrous leaves and nearly glabrous flowers.

4. Polyosma mutabilis, Blume, Mus. Bot. Lugd. Bat. I, 261. A tree 20-40 feet high; young branches lenticellate, deciduously rusty-pubescent. Leaves narrowly elliptic, tapering gradually from about the middle to each end, not caudate-acuminate, the edges quite entire; upper surface black when dry, glabrous, shining; the lower deep-olivaceous, very sparsely pubescent, the midrib and nerves adpressed-pubescent; main nerves 8-10 pairs, spreading, slightly prominent on the lower and slightly depressed on the upper surface, length 3:5-6 in., breadth 1:25-1:75 in.; petiole :5-1:1 in., slender. Racemes terminal, much longer than the leaves, with short rather sparse pubescence. Flowers :3 in. long, their pedicels about :05 in. long with 2 adpressed bracteoles. Calyx-tube about as long as the pedicel, pubescent; its lobes short, triangular. Petals many times longer than the calyx, linear, sub-obtuse, pubescent, slightly longer than the stamens. Fruit ovoid from a

broad truncate base, the apex pointed and crowned by the small persistent calyx-teeth; length 45 in.; breadth at the base 25 in.; puberulous, black when ripe, the pedicel 25-3 in. long, pubescent. Miq. Flor. Ind. Bat. Vol. I, pt. 1, 724; Suppl. 336.

Perak; King's Collector 2596, 4344, 8332; Wray 925. Johne; Lake and Kelsall 4057. Malacca; Goodenough 438.

This species is closely allied to *P. integrifolia*, Blume; but has flowers only 3 in. long on pedicels only 05 in. long, while the flowers of *P. integrifolia* measure 45 in. and its pedicels 1 in. The best distinction between the two species lies however in the fruit which is in this truncate at the base and vertically ridged, while in *P. integrifolia* the fruit has a tapering base and is not ridged.

5. Polyosma fragrans, Benn. Pl. Jav. Rar. 196. A shrub 5 or 6 feet high; young branches slender, deciduously pubescent. Leaves elliptic, tapering much to each end, the apex abruptly acuminate; the base cuneate, the edges entire; the upper surface quite glabrous; the lower sparsely adpressed-pubescent especially on the midrib and 7-10 pairs of subhorizontal faint main-nerves; length 2.5-3 in., breadth 1.1-1.35 in.; petiole 4 in., slender, pubescent. Raceme terminal, erect. rather longer than the leaves, tawny-pubescent. Flowers 35 in. long. rather crowded, their pedicels under 'l in. long with 2 adpressed bracteoles. Culyx-tube short, sericeous; the mouth with 4 small triangular teeth. Petals many times longer than the calyx, linear, acute, adpressedpubescent. Stamens shorter than the petals. Anthers linear, elongate: filaments broad, sparsely villous on the inner side. Fruit sub-globular, apiculate, glabrous, 2 in. in diam. H. f. & T. in Journ. Linn. Soc. II. 77; Mig. Fl. Ind. Bat. I, pt. I, 724; Suppl. I, 336; Clarke in Hook. fil. Flor. Br. Ind. II, 408. Itea fragrans, Wall. in Roxb. Flor. Ind. II, 420; Wall. Cat. 8472, partly.

PERAK; Scortechini 520. SINGAPORE; Wallich. DISTRIB. Sumatra.

6. Polyosma integrifolia, Blume Bijdr. 659. A tree 20-40 feet high; young branches lenticellate, deciduously rusty-pubescent. Leaves oblanceolate, the apex shortly and abruptly caudate-acuminate, gradually narrowed from the middle or above it to the petiole, the edges entire or remotely serrate, drying of a rather dark-brown colour; upper surface glabrous or with a few hairs on the midrib; the lower paler, with adpressed hairs on the midrib and sometimes also on the nerves; main nerves 8-12 pairs, spreading, interarching, slightly prominent on the lower surface only; length 3.5-8 in., breadth 1.35-3 in.; petiole .5-1 in., rather stout, pubescent. Racemes terminal, often longer than the leaves, subadpressed-sericeous. Flowers .45 in. long, rather crowded; their pedicels 1 in. long, pubescent, with 2 linear-lanceolate bracts. Calyx-tube about as long as the pedicel, pubescent; the mouth with 4 302

spreading triangular teeth. Petals linear, subacute, longer than the stamens and much longer than the calyx, slightly pubescent; anthers elongate, filaments slightly pubescent. Fruit ovoid, tapering to each end, the apex crowned by the persistent calyx-teeth and base of the style, puberulous, black when dry, 4 in. long and 25 in. in diam.; the pedicel 15 in. long, puberulous. Benn. Pl. Jav. Rar. p. 196; DC. Prodr. IV, 276; Blume Mus. Bot. I, 260; H. f. & T. in Journ. Linn. Soc. II, 77; Miq. Fl. Ind. Bat. I, pt. I, 724; Suppl. I, 335. Clarke in Hook fil. Fl. Br. Ind. II, 409. Itea fragrans, Wall. Cat. 8472, partly.

VAR. 1. typica; leaves entire.

MALACCA; Griffith 2510 (Kew Distrib.); Maingay 632. Perak; Wray 508; King's Collector 3802. Penang; Curtis 1081. Andaman Islands; King's Collectors, Prain.

VAR. 2. Wallichii, Clarke in Hook fil. Fl. Br. Ind. II, 409; Ieaves remotely serrate. P. Wallichii, Benn. Pl. Jav. Rar. p. 196; Wall Cat. 8471; H. f. & T. in Journ. Linn. Soc. II, 77; Kurz For. Flora Burma, I. 444.

ANDAMAN ISLANDS. DISTRIB. Khasia Hills, Assam.

As I have noted under *P. mutabilis*, Bl., the only tangible distinction between that plant and this is that the former has fruit truncate at the base and with 4 bold vertical grooves, while this has smooth fruit. Many of the specimens abovequoted as belonging to this are not in fruit, and I accept them as *P. integrifolia* in deference to the authority of the Flora of British India.

7. POLYOSMA LETE-VIRENS, Griff. MSS. in Herb. Kew. A tree 20-50 feet high; young branches yellowish-tomentose. Leaves drying of a yellowish-green, coriaceous, oblanceolate or narrowly-elliptic, shortly acuminate, much narrowed to the base; the edges entire, slightly revolute when dry; upper surface glabrous, shining, the midrib minutely tomentose, lower surface yellowish-tomentose; main nerves 8 or 9 pairs, spreading, interarching, prominent on the lower surface only; length 3.25-5.5 in., breadth .8-2.25 in., petiole .35-5 in. Raceme solitary, terminal, tomentose, rather longer than the leaves. Flowers 3 in. long, on pedicels 1 in. long. Calyx-tube slightly longer than the three narrowly oblong adpressed bracteoles, its mouth with 4 broad triangular obtuse teeth, yellowish-tomentose. Petals much longer than the calvx and slightly longer than the stamens, linear, tapering to the obtuse apex. villous in front, tomentose behind. Filaments nearly as long as the anthers, villous in front. Fruit ovoid or globular-ovoid, crowned by the calvx-teeth, deciduously adpressed-sericeous and lepidote, 25 in. long. the pedicel 1-2 in. P. mutabilis, Clarke in Hook. fil. Fl. Br. Ind. II. 469 (not of Blume).

Malacca; Griffith 2508, 2509; Maingay 633. Perak; King's Collector 8775. Penang; Curtis 377, 758.

Griffith's original specimens, to which he gave the MSS name P. læte-virens, have smaller leaves and more ovoid fruit on shorter pedicels than any specimens subsequently collected. But in other respects they agree with specimens more recently collected in Perak and Penang.

8. Polyosma velutina, Blume Mus. Bot. Lugd. Bat. I, 261. A small tree; young branches stout, deciduously tomentose. Leaves coriaceous, elliptic to elliptic-oblong, sometimes slightly obovate, sub-acute or obtuse, the base cuneate; the edges entire, revolute when dry; upper surface at first with a few scattered adpressed hairs, glabrous when old except the pubescent depressed midrib and main nerves; lower surface covered with soft velvety yellowish tomentum; main nerves 9-12 pairs, prominent on the lower surface only; length 4-7.5 in., breadth 1.75-3.25 in., petiole 6-1.5 in. Raceme terminal, about one and a half times as long as the leaves, stout, densely yellowish-tomentose like the calyx. Flowers 4 in. long, their pedicels rather over 1 in., with 3 narrow unequal adpressed bracteoles. Calyx-tube tomentose; its teeth triangular, acute. Petals narrowly linear, sub-acute, slightly longer than the stamens, much longer than the calvx; the filaments slightly villous in front, about equal to the anthers. Fruit ovoid, with a broad sub-truncate base, and with an apiculus formed by the remains of the base of the style, boldly 4-ridged, sparsely and deciduously strigose, 4 in. long and 3 in. in diam. at the base; the pedicel 2 in.; endocarp woody, deeply 4-grooved.

Penang; Curtis 1165; King's Collector 1352. Perak; Scortechini 2111; King's Collector 3685, 4362. Distrib. Sumatra, Java.

I identify the Penang and Perak plants with Blume's P. velutina by description only; for I have seen no authentic specimen of that species. The deep vertical ridging of the endocarp is noted of no other described species except P. mutabilis, Bl., and I think my identification is correct.

9. Polyosma Ridley, King n. spec. A tree; young branches densely and minutely tomentose. Leaves coriaceous, narrowly-elliptic, caudate-acuminate, the edges entire and slightly revolute when dry, the base cuneate; upper surface when young sparsely adpressed-pubescent, when adult glabrous and shining; lower surface covered with dense yellowish tomentum; main nerves 9-11 pairs, spreading, curving and interarching, rather prominent on the lower surface, the intermediate nerves almost as prominent; length 6-6.5 in., breadth 2-2.5 in.; petiole 1-1.75 or even 2 in., tomentose. Raceme terminal, stout, shorter than the leaves, densely covered with pale yellowish or whitish tomentum like the calyx and petals. Flowers 4 in. long, their pedicels 1 in., with 3 equal lanceolate bracteoles on the same level. Calyx-tube shorter than the pedicel, wide; the teeth broad, shallow. Petals much longer than the calyx, linear, blunt, villous in front. Stamens nearly as long

as the petals; the filaments flat, villous in front, scarcely so long as the anthers. Style subglabrous. Fruit unknown.

SINGAPORE; Ridley 3972.

A very distinct species in the neighbourhood of P. velutina, Bl., but with narrower leaves, much more tomentose flowers and inflorescence, and a wider calyx-tube.

Note.-I here take the opportunity of describing a very distinct new species from Sumatra.

POLYOSMA LONGE-PEDICELLATA, King n. spec. A shrub or tree 15 feet high; young branches coarsely adpressed-pubescent. Leaves elliptic or obovate-elliptic, abruptly and shortly acuminate; the edges slightly sinuate and very obscurely and minutely toothed, slightly recurved when dry; the base cuneate; upper surface glabrous, finely reticulate; the lower with short coarse adpressed hairs especially on the midrib, finely reticulate; main nerves 14-16 pairs, almost horizontal, slightly curved and interarching towards the edge of the bade, slightly prominent on the lower surface only when dry, the intermediate nerves almost as distinct; the reticulations minute, distinct on both surfaces; length 5.25-7 in., breadth 2.2-3.25 in.; petiole 75-1.25 in., puberulous. Raceme solitary, terminal, rather longer than the leaves, with pubescence like the young branches. Flowers 5 in. long, on slender adpressed-pubescent pedicels '3-'35 in. long, and bearing three adpressed bracteoles towards their apices. Calyx-tube 1 in. long, adpressed-pubescent, its teeth broadly triangular. Petals 4 in. long, linear, obtuse, adpressed-pubescent outside. Fruit evoid, tapering to each end, crowned at the apex by the very short calyx-lobes and by the sharp base of the style, minutely adpressed-pubescent, '5 in. long, and '3 in. in diam. Fruit pedicels 5-7 in. long, sometimes deflexed.

EASTERN SUMATRA; at elevations of 3200 and 3700 feet, Forbes 2037, 2250.

#### ORDER XLI. DROSERACEÆ.

Herbs; catching insects by means of glandular viscid hairs, or by means of petioled leaves with automatically closing laminæ. Flowers hermaphrodite, regular. Calyx 4-5- (rarely 8-) partite; or sepals free, imbricate, persistent. Petals and stamens as many as the sepals, hypogynous or nearly so. Ovary nearly free, globose or ovoid, 1-3-celled; styles 5-3, capitate, fimbriate or bifid; ovules numerous, on parietal placentas equal in number to the styles. Capsule membranous, 5-3-valved, many-seeded. Seeds with fleshy albumen; embryo cylindric or minute. Distrib. Species 110; spread over nearly all temperate and tropical lands except the islands of the Pacific.

### 1. DROSERA, Linn.

Perennial herbs, scapigerous or with a leafy stem, glandular-pilose. Leaves radical or alternate, usually circinate in vernation; stipules 0, or scariose and adnate to the petiole. Calyx free from the ovary, 4-8-partite, sepals persistent. Petals 4-8, hypogynous or scarcely perigynous, white or rose-coloured, withering, peristent. Stamens as many

as the petals, hypogynous or scarcely perigynous. Ovary 1-celled with 2-5 styles; ovules parietal, numerous. Capsule loculicidally 2-5-valved. Seeds numerous; in the Indian species obovoid-ellipsoid, with the testa black; smooth, reticulate, not lax. DISTRIB. Species 100; scattered throughout the world except Polynesia; very numerous in Australia.

Leaves cauline, linear ... ... ... ... ... ... 1. D. indica.

Leaves all radical, spathulate-cuneate ... 2. D. Burmanni.

1. DROSERA INDICA, Linn. Sp. Pl. 282. Stems subcreet, from 1-6 in. high. Leaves cauline, alternate, linear, elongate, very glandular-pubescent, hardly broader than the glabrous petiole; the stipules much shorter than the petioles. Racemes leaf-opposed; flower-pedicels ·25 in. or more in length, glandular-hairy. Styles 3, bifid to near the base. DC. Prodr. I, 319; Roxb. Fl. Ind. II, 313; Wall. Cat. 1244; Wight Ill. t. 20; W. & A. Prodr. 34; Planch. in Ann. Sc. Nat. Ser. III, Vol. IX, 204; Miq. Fl. Ind. Bat. I, Pt. II, p. 120; H. f. & T. in Journ. Linn. Soc. II, 82; Thwaites Enum. 21; Dalz. & Gibs. Bomb. Fl. 12; Kurz im Journ. As. Soc. 1876, Pt. II, 310; Clarke in Hook. fil. Fl. Br. Ind. II, 424. D. Finlaysoniana, Wall. Cat. 3752. D. serpens, Planch. l. c. 204. D. hexagyna, Blanco Fl. Filip. 139; Rheede Hort. Mal. X, t. 20.

In swampy places in all the Provinces, except the Andaman and Nicobar Islands. DISTRIB. The southern part of British India, Ceylon, Burma, the Malayan Archipelago, China, tropical Australia, Africa.

2. DROSERA BURMANNI, Vahl Symb. III, 50. Stem very short; the leaves all radical, spathulate-cuneate, glandular-pubescent; the stipules nearly as long as the petioles. Scapes 1-3, two to eight inches high, the raceme occupying the upper fourth only, glabrescent. Flower-pedicels less than 25 in. long, glabrous. Styles 5, not bifid. Don Prodr. 212; DC. Prodr. I, 318; Roxb. Fl. Ind. II, 113; Wall. Cat. 1242; Wight Ill. t. 20; Wight Ic. t. 944; W. & A. Prodr. 34; Planch. in Ann. Sc. Nat. Ser. III, Vol. IX, 190; Miq. Fl. Ind. Bat. I, Pt. II, p. 120; H. f. & T. in Journ. Linu. Soc. II, 82; Clarke in Hook. fil. Fl. Br. Ind. II, 424; Thwaites Enum. 21; Dalz. & Gibs. Bomb. Fl. 12; Kurz in Journ. As. Soc. 1876, Pt. II, 310.

In swampy places in all the Provinces, except the Andaman and Nicobar Islands. DISTRIB. Plains of British India, Ceylon, the lower Himalaya, Malayan Archipelago, China, Japan, Australia, West Africa.

### ORDER XLII. HAMAMELIDEÆ.

Trees or shrubs. Leaves alternate, petiolate, simple or palmately lobed; stipules 1-2, rarely wanting, deciduous or rarely persistent. Flowers hermaphrodite or unisexual, collected into heads or spikes. Calyx small or 0, adnate to the ovary. Petals 0 or 4-5, perigynous or

nearly epigynous. Stamens  $4-\infty$ , perigynous, or rarely hypogynous; anthers dehiscing longitudinally. Ovary 2-celled; styles 2, separate and ultimately divaricate, usually persistent; ovules  $1-\infty$ , axile, pendulous. Capsule woody, its segments often bifid; endocarp often horny and separating from the exocarp. Seeds 1, or many and then usually only the lowest in each cell perfect. DISTRIB. Species 35; Eastern Asia, the Himalaya, Khasia Hills, Malaya, China and Japan; also in North America and in South Africa.

Ovules solitary in each cell:—

Stipules small and deciduous; heads ebracteate; stamens 5, with short-filaments, the connective produced into a horn; flowers hermaphrodite ... ... ... 1. Maingaya.

Gvules 6 or more in each cell:—

Stipules large, coriaceous; heads ebracteate; stamens 10-14, without appendages; flowers polygamous ... 2. Bucklandia.

Stipules absent; heads with numerous coloured bracts; stamens 7-10 without appendages; flowers hermaphrodite... 3. Rhodoleia.

### 1. MAINGAYA, Oliver.

A tree. Leaves alternate, undivided, petioled, persistent; stipules small, deciduous. Heads peduucled, quasi-terminal, ebracteate, of about 15 flowers. Calyx-tube adherent to the ovary; the limb closed, splitting up on one side a little way from the base and then circumscissile and deciduous. Petals 5, perigynous, linear, circinate in estivation. Stamens 5, perigynous, filaments very short, connective produced as a horn. Staminodes about 10, horned. Ovary half-inferior, 2-celled; styles 2, distinct, short; ovule 1 in each cell, pendulous. Capsule woody, ovoid; endocarp horny, separating from the exocarp. Seed narrowly ellipsoid, and with pale thick iridescent testa.

Maingaya malayana, Oliver in Trans. Linn. Soc. XXVIII, 517, t. 44. A tree 50 or 60 feet high; young branches rather slender, glabrous, pale-coloured when dry, lenticellate. Leaves membranous, oblonglanceolate or elliptic, acuminate; the base broad, rounded or minutely cordate, sometimes slightly peltate; both surfaces glabrous, shining, the lower of a bright brown tint when dry; main nerves 7-10 pairs, curving upwards, slightly prominent on the lower surface only; length 6.5-9 in., breadth 2-4.5 in., petiole '75-1 in., slender; stipules small, tomentose, caducous. Capitules from '75-1 in. in diam., solitary, or two or three from a short peduncle. Flowers '5 in. long, sessile; buds oblong or obovoid-oblong. Calyx thin, puberulous, not opening but separating in an irregular circumscissile manner. Petals linear, obtuse, glabrous, four or five times as long as the calyx. Capsule woody, ovoid, tapering into the thick pedicel, with truncate compressed apex, more than half enve-

loped by the calyx-tube, striate, minutely pubescent, '6 in. long, '4 in. wide at the apex. Seeds narrowly ellipsoid, tapering much to the apex; the testa thick, white, iridescent, with elongate reticulations. Clarke in Hook. fil. Fl. Br. Ind. II, 428.

Penang; Maingay 1513; Curtis 659. Perak; Scortechini 819; King's Collector 7330.

## BUCKLANDIA, Br.

A tall glabrous tree. Leaves alternate, acuminate, entire, longpetioled; stipules solitary or in pairs, large, oblong, coriaceous, deciduous. Inflorescence of 2-5 peduncled heads, at first enclosed between a pair of stipules; flowers adnate by their calyces, about 8 in a head, polygamous. Calyx-tube aduate to the ovary; limb 5-lobed. Petals in the of flower linear-spathulate, fleshy, variable in number; in the Q fl. rudimentary. Stamens 10-14 (in the Q none); filaments long. Ovary half-inferior, 2-celled; styles 2, separate, soon divaricate; ovules in each cell 6 in two rows. Capsule nearly superior, woody, subglobose; endocarp horny, showing a tendency to separate from the exocarp. Seeds in each cell 6, oblong, trigonous; the upper wingless, solid, without any embryo, the lower one in each cell winged and fertile.

BUCKLANDIA POPULNEA, R. Brown in Wall. Cat. 7414. broadly ovate sub-reniform or sub-orbicular, the apex acuminate or tricuspidate, the edges entire; the base broad and rounded, subcordate or truncate, or narrowed and cuneate; both surfaces glabrous; the lower sometimes pubescent on the nerves; main nerves 5-7, radiating palmately from the base, the lower on each side slender, prominent on the lower surface; length 2.5-6.5 in., breadth 1.5-7 in.; petiole 8-3 in., usually glabrous but sometimes pubescent; stipules oblong, sub-falcate, obtuse, ·9-1·25 in. long, slightly pubescent at the base, breadth ·25-·45 in. Griff. in Asiat. Res. XIX, 95, with two plates; Clarke in Hook. fil. Fl. Br. Ind. II, 429. B. populifolia, H. f. & T. in Journ. Linn. Soc. II, 86; Kurz Forest Fl. Brit. Burma, I, 445. Liquidambar tricuspis, Miq. Fl. Ind. Bat. I, Pt. I, 1097; and Suppl. 346, with a figure.

PERAK; Scortechini; on Gunong Inas, elevat. 5000 feet, Wray 4151; on Ulu Batang Padang, about 3900 feet, Wray 1535. DISTRIB. The temperate Himalaya from Nepal to Bhotan, elevat. 5000-8000 ft.; Khasia Hills 4000-6000 feet; Burma, Java, Sumatra.

None of the Perak specimens have flowers or fruit. Scortechini's have leaves in no way differing from those from the Himalaya and Khasia mountains, except that the main nerves and petioles, even when old, are pubescent. Wray's specimens, on the other hand, have smaller ovate leaves, rarely tri-cuspidate and never sub-rotund or reniform; their petioles are sometimes slightly hairy, but their main

nerves have tufts of hair only in their axils. In all the Perak specimens the stipules are much narrower than in those from the Himalaya and Khasia mountains.

#### 3. RHODOLEIA, Hook.

Glabrous woody shrubs. Leaves exstipulate, evergreen, alternate, with long petioles, coriaceous, glaucous beneath. Flowers in few-flowered axillary pedunculate reflexed capitula surrounded by numerous whorls of coloured bracts, increasing in size from without inwards. Flowers unsymmetrical, hermaphrodite, adnate in the capitula by their calvees. Calyx-tube adherent to the lower half of the ovary; its limb annular, truncate, glandular inside. Petals rosy, 2-4, very unequal, unilateral, deficient in the central flowers, clawed, oblong-oblanceolate. Stamens 7-10, inserted with the petals; the filaments thick, elongate; the anthers linear-oblong, basifixed, 2-celled, the connective not pro-Ovary half-inferior, ovoid, the apex bifid, 2-celled, or 1-celled by abortion of the septum. Style subulate, elongate, deciduous, stigma simple. Ovules numerous in each cell, inserted on two biseriate axile placentas. Capsule sub-ligneous, bicuspidate, 2-celled, 2-valved; the valves bifid, many-seeded. Seeds imbricate, not winged, angular, compressed, testa crustaceous. DISTRIB. Two species; Hongkong and Sumatra.

RHODOLEIA TEYSMANNI, Miq. in Versl. en Meded. K. Akad. v. Wetensch. VI, 124. Leaves oblong to elliptic, the apex obtuse, slightly narrowed at the base to the long petiole, both surfaces rugulose when dry; main nerves 7-9 pairs, spreading, faint; the midrib prominent beneath; length 2.5-5 in., breadth 1.5-2 in., petiole 75-1.75 in. Capitula solitary, about 75 in. long, ovoid, on decurved peduncles about 25 in. long; the bracts broad, blunt, the outer short and glabrous, the inner longer and covered with reddish hair. Stamens and petals subequal, about 5 in. long. Ripe capsules glabrous, about 4 in. long, dehiscing widely for about half their length. Miq. Fl. Ind. Bat. Vol. I, pt. 2, p. 669; Suppl. 532.

MALACCA; Hervey; Ridley 3289. PERAK; elev. 3900 feet in Batang Padang Valley, Wray 1481. DISTRIB. Sumatra.

#### ORDER XLIII. HALORAGEÆ.

Herbs, often aquatic. Leaves opposite or whorled, or partly alternate, when submerged often pinnatisect, always exstipulate. Flowers small, axillary, solitary or fascicled, sessile or pedicelled, hermaphrodite or unisexual, the nodes between the floral whorls sometimes developed. Calyx-lobes 4 or 0. Petats 4 and epigynous, or absent. Stamens 8, 4 or 1, epigynous in the bisexual flowers. Ovary inferior, 4-2-or 1-celled;

the styles equal in number to the cells, simple or finely lobed; ovules 4, (1 in *Hippurus*) pendulous. *Fruit* small, dry or drupaceous, with cells as in the ovary, indehiscent, or separating into its component carpels. *Seeds* 4 or 1. DISTRIB.; about 80 species, cosmopolitan.

Terrestrial; fruit 1-celled, 1-seeded... ... 1. Haloragis.

Aquatic (floating); fruit separating into its component
carpels ... ... 2. Myriophyllum.

### 1. HALORAGIS, Forst.

Branching herbs. Leaves opposite, the upper sometimes alternate, toothed, rigid. Flowers minute, nearly sessile in the axils of bracts, spicate or racemose, partially unisexual or hermaphrodite. Calyx-tube 4-8-ribbed; lobes 4, erect, persistent, acute, valvate. Petals 4, coriaceous, often wanting in the 2. Stamens 8, epigynous. Ovary 2- or 4-celled, with 4 pendulous ovules; stigmas 4 (in the females at least), sessile, feathery. Fruit a dry, 2-4-celled, 2-4-seeded nut; but in the following species by abortion 1-celled, 1-seeded. Distrib. Species 40; N. Asia, Australia.

HALDRAGIS MICRANTHA, R. Brown in Flinders Voy. II, 550. A branching glabrous herb. Leaves opposite, ovate, acute, denticulate; the petioles very short, diminishing in size towards the inflorescence. Flowers about '05 in., on pedicels shorter than themselves, in terminal panicle-like racemes. Sepals triangular, much smaller than the petals. Fruit shining, 8-ribbed, about '05 in. long, 1-celled, 1-seeded. Clarke in Hook. Flor. Br. Ind. II, 430; Benth. Fl. Austral. II, 482. H. tenella, Brongn. in Duperr. Voy. t. 68. Gonocarpus micranthus, Thunb. Fl. Jap. t. 15; DC. Prodr. III, 66. Goniocarpus micranthus, Koen. & Sims Ann. Bot. I, 546, t. 12.

At elevations of about 5000 feet on the Perak Central Range? Distrib. Malaya, China, Australia and New Zealand. Khasia mountains; at elevations of from 5000-7000 feet.

I include this as a Perak plant with some hesitation. Scortechini's specimens are not now in the Calcutta Herbarium, although his field note is.

## 2. Myriophyllum, Linn.

Glabrous, aquatic herbs. Leaves dentate-serrate or pectinate-pinnatifid, or entire, often whorled. Flowers small, sessile or nearly so, in the axils of floral leaves or in nearly naked spikes; monœcious or hermaphrodite. Male; calyx-tube short, limb 2-4-fid or 0; petals 2-4; stamens 2-8. Female; calyx-tube deeply 4-furrowed, limb 0 or of 4 minute lobes; petals minute or 0; ovary inferior, 4- or 2-celled; styles 2 or 4, short, usually recurved, the stigmas plumose; ovules solitary

in each cell, pendulous. Fruit 4-furrowed, or separating into 4 or 2 carpels. Distrib. Species 15; cosmopolitan.

Myriophyllum intermedium, DC. Prodr. III, 69. Leaves alternate, solitary or in fascicles of two or three, sometimes in whorls, linear, entire or serrate, '5--1 in. long. Fruit axillary, oblong, only about '05 in. long, with rounded and minutely scabrous ridges and shallow furrows between, ultimately separating into its component carpels. Miq. Flor. Ind. Bat. Vol. I, pt. 1, 634; Clarke in Hook. fil. Fl. Br. Ind. II, 433. M. indicum, Wight Ill. t. 102, (exclude the fruit). M. varietfolium, Hook. Ic. Pl. t. 289. M. lineare, Heyne MSS. Haloragis oliyantha, W. & A. Prodr. 338; Wight Ic. t. 1061 (not of Arn.)

Malacca; Griffith (probably on Mount Ophir). DISTRIB. Mountains of the Malayan Archipelago and of the South of British India; Australia, New Zealand, South America.

#### ORDER XLIV. RHIZOPHOREÆ.

Trees or shrubs. Leaves opposite and stipulate (alternate and exstipulate in Anisophyllea), usually coriaceous, glabrous; stipules interpetiolar, very caducous. Flowers axillary, usually bisexual (unisexual in Anisophyllea), surrounded at the base by connate or cupuliform bracts, or ebracteate. Calyx more or less adnate to the ovary; limb produced beyond the ovary, 4-14-lobed; lobes valvate, persistent. Petals equal in number to but usually smaller than the sepals, entire, emarginate, 2-fid or lacerate. Stamens usually twice the number of the petals, in pairs, opposite to and partly embraced by them; rarely indefinite (Kandelia); anthers 2-celled, rarely multi-loculate (Rhizophora). Ovary more or less adnate to the calyx, from 5-1-celled by solution of the septa; styles connate (distinct in Anisophyllea); stigma often lobed; ovules usually 2 in each cell, pendulous. Fruit coriaceous or woody, crowned or surrounded by the calyx-limb, mostly indehiscent, 1-celled, 1-seeded. Seed pendulous, arillate or not; albumen fleshy or 0; embryo inverted, small if surrounded by albumen, elongated if exalbuminous; radicle macropodous in the tribe Rhizophorem, perforating the apex of the pericarp and germinating while the fruit still adheres to the tree.— DISTRIB. Tropical plants; many sharing with an arboreal vegetation the muddy shores of the estuaries of rivers. Genera 17, species about 70.

Leaves opposite, stipulate; style connate:—

TRIBE I. RHIZOPHOREE. Embryo exalbuminous, with a large radicle germinating while the fruit is still on the tree:—

Calyx 4-lobed; petals 4, entire; stamens 8; ovary 2-celled ... ... ... 1. RHIZOPHORA.

Calyx 8-14-lobed; petals 8-14, 2-lobed or deeply emarginate; ovary 2-4-celled; stamens 16-28 ... 2. BRUGUIERA.

Calvx 5- or 6-lobed; petals 5 or 6, their apices ciliate or with clavate or capitate bristles; stamens 10-12 3. CERIOPS. Calyx 5-or 6-lobed; petals 5 or 6, multifid; stamens indefinite; stigma 3-lobed KANDELIA. TRIBE II. LEGNOTIDEE. Embryo immersed in fleshy albumen, radicle not unusually large and not germinating in the fruit :-Flowers 5-8-merous in trichotomous cymes; calyxtube minutely bracteolate, half-superior, the calyx-lobes erect; stigma small, not lobed ... 5. CARALLIA. Flowers 5-merous, axillary, solitary or in pairs; calyx ebracteolate, half-superior, its lobes reflexed; stigma discoid, 5-10-lobed ... PELLACALYX. Flowers 4-5-merous, in axillary fascicles; calyx-tube ebracteolate, adnate to the base of the ovary, its lobes reflexed; stigma discoid, 5-lobed GYNOTROCHES. Leaves alternate, exstipulate; style distinct:-TRIBE III. ANISOPHYLLEE. Leaves alternate and exsti-

#### 1. RHIZOPHORA, Linn.

8. ANISOPHYLLEA.

pulate; flowers unisexual; styles distinct

Trees. Branches marked by leaf-scars. Leaves coriaceous, glabrous, opposite, mucronate. Stipules large, in pairs, interpetiolar, caducous. Flowers rather large, on axillary 2-3-chotomously-divided and few-flowered cymes. Calyx 4-lobed, surrounded at the base by connate bracteoles. Petals 4, entire, inserted on a fleshy disc. Anthers 8, subsessile, multi-loculate. Ovary 2-celled, half-inferior, projecting beyond the calyx as a fleshy cone; cells 2-ovuled; stigma bifid. Fruit coriaceous, ovoid or obconic, with the reflexed persistent calyx-teeth at its base. Radicle elongated, perforating the apex of the fruit and descending from the tree into the mud.—Distrib. About 5 species; frequent on muddy tropical shores.

Leaves elliptic; cymes longer than the petioles, usually 3-flowered; petals fleshy, lanate in front ... ... 1. R. mucronata.

Leaves oblong to oblong-lanceolate; cymes shorter than the petioles, 2-flowered; petals thin, glabrous ... ... 2. R. conjugata.

1. Rhizophora mucronata, Lamk. Dict. VI, 160, t. 396, f. 2. A large evergreen glabrous shrub or tree; young branches thick, with bold cicatrices, rather pale. Leaves elliptic, tapering to each end, the apex mucronate; upper surface reticulate when dry, the main nerves faint and depressed; the lower surface minutely rugulose and with black dots, even when dry the nerves invisible; length 5-7 in., breadth 2·5-4·25 in., petiole 1·2-1·75 in. Cymes axillary, slightly longer than the petioles, usually 3-rarely 2-flowered. Flowers 5-6 in. long, their pedicels shorter. Calyx-lobes coriaceous, triangular, subacute, glabrous.

Petals shorter than the sepals, linear-lanceolate, thick, lanate on the margins and inner face. Stamens 8, filaments short, anthers linear. Fruit inversely obovoid with the reflexed persistent calyx-teeth at its base, 1.5 in. long; the extruded radicle 1-2 feet long, cylindric, 6 in. in diam. when dry. DC. Prodr. III, 32; Bedd. Fl. Sylv., Anal. Gen. t. XIII, fig. 4; Dalz. & Gibs. Bomb. Fl. 95; Wight III. I, 209; Ic. t. 238; Kurz For. Flor. Burm. I, 447; Hook. fil. Fl. Br. Ind. II, 435; Trimen Flora Ceylon, I, 151. R. macrorrhiza, Griff. in Trans. Med. Phys. Soc. Calc. VIII, 2. R. candelaria, W. & A. Prodr. I, 310; Wall. Cat. 4878. R. Mangle, Roxb. (not of Linn.) Fl. Ind. II, 456. R. latifolia, Miq. Fl. Ind. Bat. Suppl. 324.—Rheede Hort. Mal. VI, t. 34.

In all the provinces, at the mouths of rivers; very common. DISTRIB. The Tropics of the Old World and of Australia.

The original specimens in the Calcutta Herbarium of  $R.\ latifolia$ , Miq. are only large-leaved specimens of this.

2. Rhizophora conjugata, Linn. Sp. Pl. 634. A small glabrous tree; young branches clavate, smooth, pale, the upper part with bold cicatrices. Leaves oblong to oblong-lanceolate, tapering to each end, the apex mucronate; when dry the upper surface faintly reticulate, the main nerves visible; the lower surface not showing the main-nerves but the midrib there prominent, remotely pustulate and minutely dotted; length 5-6 in., breadth 1.65-2.5 in., petiole 8-1.25 in. Cymes axillary, shorter than the petioles, 2-flowered. Calyx-lobes oblong, concave, acute. Petals slightly shorter than the calyx, thin, glabrous. Stamens 6-8; filaments short, anthers linear. Frait inversely clavate, 1 in. long, the protruding radicle from a few inches to a foot long, cylindric; 25-3 in. in diam., when dry. DC. Prodr. III, 33; Blume Mus. Bot. I, 134; Wight Ill. I, 309; Kurz. For. Flora Burma, I, 447; Hook. fil. Fl. Br. Ind. II, 436. R. apiculata, Blume Flor. Jav. I, 91. R. candelaria, DC. Prodr. III, 32; Trimen Flora Ceylon, I, 151.

In all the Provinces, at the mouths of rivers and in tidal marshes. DISTRIB. The Tropics of the Old World.

## 2. BRUGUIERA, Lamk.

Trees or shrubs. Leaves usually coriaceous, oblong, quite entire. Peduncles axillary, cymose, or solitary. Flowers rather large, coriaceous. Calyx 8-14-merous, obconical or campanulate, ebracteate, adnate to the base of the ovary; lobes subulate-lanceolate, valvate. Petals oblong, equal in number to the calyx-lobes, 2-lobed or emarginate, appendiculate, embracing the stamens by pairs. Stamens 16-28; filaments filiform; anthers linear, mucronate, about as long as the filaments. Ovary 2-4-celled, included in the calyx-tube; cells 2-ovuled; style filiform;

stigma 2-4-lobed, minute. Fruit coriaceous, included in or adnate to the calyx-tube, 1-celled, 1-seeded. Germination as in Rhizophora. DISTRIB. Species about 7, in the tropics of the Old World.

Flowers 1 in. long or upwards, solitary :-Petals 2-lobed, each lobe with 2-4 apical bristles, otherwise glabrous Petals 2-lobed, the sinus between the lobes with one bristle; the edges densely clothed with short white hairs 2. B. eriopetala. Flowers not more than 5 in. long, in axillary cymes:-Lobes of the calyx as long as the tube, spreading or reflexed; petals bifid, each lobe crowned by 3-5 pale hairs, their edges with scanty white hairs outside ... 3. B. caryophylloides. Lobes of calyx only one-fourth the length of the tube, erect; petals with broad emarginate apex, bearing

5 white flexuose hairs, the edges glabrous

- 1. B. gymnorhiza.

- ... 4. B. parviflora.
- 1. Bruguiera Gymnorhiza, Lamk. Encycl. IV, 696; Ill. t. 397. large glabrous evergreen tree: young branches stout, marked with cicatrices towards the apex. Leaves elliptic or elliptic-oblong, acute, the base cuneate; upper surface shining when dry, the nerves faint; the lower dull, the veins invisible but the midrib very prominent; length 35-6 in., breadth 1.75-2.5 in., petiole 1.3-1.6 in. Flowers solitary, axillary, 1.25-1.5 in. long; the peduncles about .35 in., deflexed. Calyx coriaceous, campanulate, ribbed, cut for half its length into 12 narrow acute suberect teeth. Petals shorter than the calyx-lobes and equal to them in number, sub-convolute, two-lobed at the apex and with 2-4 bristles at the point of each lobe, pubescent at the base, otherwise glabrous. Stamens two opposite each petal and shorter than it, each alternate filament short; anthers linear. Fruit small, in the fundus of the calyx-tube, containing a single seed germinating in situ and forming a cylindric radicle 1-2 feet long prior to its fall. W. & A. Prodr. 311; Brand. For. Fl. 219; Miq. Fl. Ind. Bat. I, pt. 1, 586; Blume Mus. Bot. 136; Kurz For. Flor. Burm. I, 450; Hook. fil. Fl. Br. Ind. II, 437; Dalz. & Gibs. Fl. Bomb. 95; Trime Flora Ceylon, I, 153. B. Rheedii, Miq. 1. c. 587; Blume, 1. c. 136; Wight Ic. t. 239; Dalz. & Gibs. Bomb. Fl. 95; Hook. Ic. Pl. t. 397. Rhizophora gymnorrhiza, Linn. Sp. 634; Roxb. Fl. Ind. II, 460; Griff. Ic. Pl. Asiat. t. 645; Wall. Cat. 4874; Thwaites Eu. Pl. Ceyl, 120.

Tidal Forests in all the provinces. DISTRIB. Malaya, Australia, Africa.

2. BRUGUIERA ERIOPETALA, W. & A. in Wight Ill. I, p. 210; Wight Icon. 239 B. A tree; young branches slender, with cicatrices towards the apex. Leaves oblong-lanceolate or oval-oblong, sometimes rather oblanceolate, acute, the base very caucate; upper surface shining, the 314

nerves faint; the lower reddish-brown when dry, the nerves very faint or obsolete but the midrib prominent; length 3.25-4 in., breadth 1.25-1.65 in., petiole 6-75 in. Flowers 1-1.25 in. long, solitary, axillary; the peduncle short, decurved. Calyx as in B. gymnorhiza, but the lobes only 10. Petals shorter than the calyx-lobes, deeply bifid, with a stout seta in the sinus between the two narrow lobes, the edges densely clothed with stout white hair, the apices of the lobes bearing one short bristle each. Fruit as in B. gymnorhiza, but the germinating radicle shorter. Wall. Cat. 2451; Brandis For. Flora, 219; Hook. fil. Fl. Br. Ind. II, 438. B. Rumphii, Blume Mus. Bot. Lugd. Bat. I, 138. B. parietosa, Griff. Notul. IV, 670; Ic. Pl. Asiat. t. 641.

In similar situations to the last, but not so common. MALACCA; Griffith 2206; Maingay 642. Penang; Curtis 514. Pahang; Ridley 1045 C. Perak; Scortechini; Wray 2711. Distrib. Malayan Archipelago, Australasia.

3. BRUGUIERA CARYOPHYLLOIDES, Blume Enum. Pl. Javae I. 93. A tree; young branches slender, with cicatries towards the apex. Leaves oblanceolate or ovate-oblanceolate, slightly oblique, acute, the base cuneate; upper surface shining when dry, the lower dull, both pale in colour and the nerves faint in both; length 2.5 to 4 in., breadth 1-1.65 in., petiole .75-1 in. Cymes axillary, rather longer than the pedancles, erect, laxly 2- or 3-flowered, (rarely only 1-flowered). Flowers about 4 in. long, on short pedicels. Calyx-tube clavate, not grooved when fresh, surmounted by about 8 linear obtuse fleshy lobes as long as itself, at first spreading, but finally reflexed. Petals as many as but shorter than the calyx-lobes, apex bifid, the margins with scanty white hairs outside; the apical lobes obtuse, each crowned by 3-5 flexuose pale hairs, the sinus with a single bristle. Stamens 16, unequal. Fruiting-calva about 5 in long, the fruit in its fundus with the growing radicle protruding and growing to 6-8 in. in length. Arn. in Ann. Nat. Hist., I. 368; Wight Ill. 210; Miq. Fl. Ind. Bat., Vol. I, Pt. I, 589; Kurz For. Flora Burma I, 450; Hook. fil. Fl. Br. Ind. II, 438. Trimen Flora Ceylon. I. 153. Rhizophora caryophylloides, Jack Mal. Misc. I. 34; Hook. Bot. Misc. II, 80; Wall. Cat. 4879; DC. Prod. III, 32. Kanilia caryophylloides. Blume Mus. Bot. Lugd.-Bat. I, 141; Thwaites En. Pl. Cevl. 120. B. parviflora, Wall. (not of Blume) Cat. 4877 C and D.

In tidal Forests like the other species of the genus; in all the

provinces. DISTRIB. Malay Archipelago.

4. BRUGUIERA PARVIFLORA, W. & A. Prodr. 311; Arn. in Ann. Nat. Hist. I, 369. A shrub or small tree; young branches slender, the cicatrices distant. Leaves oblong-lanceolate to elliptic-lanceolate, scute, much attenuate at the base; upper surface shining and showing the

nerves faintly when dry; the lower dull and evenious; length 3-3·5 in., breadth 8-1·25 in., petiole 75-1 in. Cymes axillary, longer than the petioles, laxly 2-5-flowered, erect. Flowers erect, 4-5 in. long, their peduncles slightly shorter. Calyx-tube cylindric, crowned by 8 lanceolate erect lobes about a fourth of its own length. Petals as many as the calyx-lobes but shorter, oblong; the apex broad, emarginate and bearing five white short hairs, otherwise glabrous. Stamens 16, unequal, two embraced by each petal. Ovary 3-celled, fruiting-calyx cylindric, ribbed, 1 in. long, the fruit concealed in it; radicle growing to 4-5 in. before falling. Wight Ill. 210; Miq. Flor. Ind. Bat. Vol. I., Pt. 1, 588; Kurz For. Flora Burma, II, 449. B. cylindrica, W. & A. Prod. 311. Rhizophora cylindrica, Roxb. Hort. Beng. 36. R. parviflora, Roxb. Fl. Ind. II, 461; Wall. Cat. 4877. Kanilia parviflora, Blume Mus. Bot. Lugd.-Bat. I, 140 t. 30; Dalz. & Gibs. Flora Bombay 95.

Tidal Forests in all the provinces. DISTRIB. Malaya.

### 3. CERIOPS, Arn.

Shrubs. Leaves opposite, ovate or obovate. Stipules caducous, axillary. Cymes condensed. Calyx 5-6-merous, surrounded at the base by connate bracts. Petals 5-6, inserted at the base of a 10-12-lobed fleshy disc, emarginate or truncate; their apices ciliate or with clavate or capitate bristles. Stamens 10-12, filaments inserted between the lobes of the disc; anthers 2-celled. Ovary 3-celled (at least above), cells 2-ovuled; style short, stigma simple. Fruit obovoid, the reflexed limb of the calyx persistent at its base, 1-celled, 1-seeded. Germination as in Rhizophora. Distrib. Species 7; river-mouths, tropics of Old World.

Flowers sessile; petals setose-ciliate at the apex; anthers linear, longer than the filaments ... ... 1. C. Roxburghiana. Flowers pedicelled; petals with 3 short clavate processes at apex; anthers ovate, acute, much shorter than filaments 2. C. Candolleana.

1. Ceriofs Roxburghiana, Arn. in Ann. Nat. Hist. I, 364. A glabrous dwarf tree or shrub 2-4 feet high. Leaves elliptic, slightly obovate, or orbicular-elliptic, the apex rounded, the edges slightly recurved, rather narrowed at the base, (often somewhat abruptly); main nerves faint on both surfaces; the upper surface shining, the lower dull; length 2·25-3·75 in., breadth 1·5-2·25 in., petiole ·75-1·15 in. Cymes axillary, shortly pedunculate, not branched; flowers ·2 in. long, sessile. densely crowded. Callyx with 5 or 6 ovate-lauceolate sub-acute lobes. Petals oblong-obovate, the apex emarginate or sub-truncate, setose-ciliate. Anthers linear, much longer than the short filaments. Fruit clavate, ·5 or 6 in. long, the protruded radicle a few inches long, clavate,

deeply ridged and furrowed. Miq. Fl. Ind. Bat. Vol. I, Pt. 1, 591; Kurz For. Flora Burma, I, 448; Hook. fil. Fl. Br. Ind. I, 436; Trimen Flora Ceylon I, 153. Rhizophora decandra, Roxb. Hort. Beng. 36; Wall. Cat. 4875.

At the mouths of rivers, probably in all the provinces. DISTRIB. Tropical tidal forests of the old World.

CERIOPS CANDOLLEANA, Arn. in Ann. Nat. Hist. I, 364. A glabrous shrub or dwarf tree 3-6 feet high. Leaves obovate-oblong, obtuse, sometimes emarginate, much and gradually attenuate to the base, the edges slightly reflexed, main nerves slightly visible on both surfaces when dry, length 1.75-2 in., breadth 1-1.5 in., petiole 6-1 in. Cymes axillary, peduncled, branched; flowers 25 in. long, on short pedicels. Calyx-lobes 5, oblong, sub-obtuse. Petals oblong-obovate, the apex truncate or emarginate and with 3 short clavate appendages. Stamens 10, nearly as long as the petals; the authors ovate, acute, only about a fourth of the length of the filaments. Fruit clavate, 5 in. long, the protruded radicle a few inches to a foot long, (rarely longer,) gradually thickening to near the apex and then becoming acute, deeply grooved and ridged. Blume Mus. Bot. Lugd.-Bat. I, 142; Wight III. 209; Icones t. 240; Mig. Fl. Ind. Bat. Vol. I, Pt. 1, 590; Brandis For. Flora 218; Kurz For. Flora Burm. I, 448; Hook. fil. Fl. Br. Ind. II, 436; Trimen Flora Ceylon I, 152. Rhizophora timorensis, DC, Prod. III, 32.

At the mouths of rivers and in tidal swamps in all the provinces. DISTRIB. Tropics of old World.

## 4. KANDELIA, Wight & Arn.

A small tree. Leaves opposite, coriaceous, oblong, obtuse; stipules caducous. Peduncles axillary, dichotomously branched, few-flowered. Flowers rather large, white. Calyx 5-6-merous, surrounded at the base by connate bracteoles, adnate to the base of the ovary; lobes linear—lanceolate, valvate. Petals 5 or 6, bifid; the lobes multifid, segments capillary. Stamens indefinite, anthers small; filaments slender, exserted. Ovary 1-celled, half-inferior, prolonged above the calyx into a fleshy cone; style slender, stigma 3-lobed; ovules 6, fixed in pairs to a central column. Fruit ovoid, girt at the base by the reflexed limb of the calyx, 1-celled, 1-seeded. Radicle fusiform, very acuminate. Germination as in Rhizophora. Distrib. A single species; British India, Malaya.

1. Kandelia Rheedii, W. & A. Prodr. I, 310. Leaves narrowly elliptic-oblong, obtuse, narrowed at the base, glabrous, 2-4 in. long, the petiole '4-6 in. Peduncles longer than the petiole, 2-3-chotomous, 4-9-flowered. Flowers '6-8 in. long, white. Fruit 1 in. long, obovoid; the protruded radicle 6-15 in. long, cylindric, not ridged. Arn. in Ann. Nat.

Hist. I, 365; Blume Mus. Bot. 185; Wight Ill. I, t. 89; Hook. Ic. Pl. t. 362; Wall. Cat. 4876; Kurz For. Flor. Brit. Burm. I, 449. Kurz For. Flora Burma, I, 449; Hook. fil. Fl. Br. Ind. II, 437. Rhizophora Candel, Linn. Sp. Pl. 443; DC. Prodr. III, 32; Roxb. Hort. Beng. 36; Wall. Cat. 4876.

Andaman Islands, and probably also in the other provinces.

## 5. CARALLIA, Roxb.

Trees or shrubs. Leaves coriaceous, glabrous, petiolate, ovate or elliptic; stipules caducous. Peduncles short, rather thick. Flowers small, in short 3-chotomous axillary branching cymes, sessile and often crowded. Calyx-tube cylindric or campanulate, minutely bracteate at the base; limb 5-8-lobed, the lobes erect, short, valvate. Petals 5-8, inserted on the margin of a crenulated disk lining the calyx-tube, clawed, orbicular, 2-fid or entire, subservate or lacerate at the apex. Disc epigynous, 10-16-lobed. Stanens inserted with the petals, filaments filiform; anthers small, oblong. Style subulate or filiform. Fruit small, globose, coriaceous, 1-celled, 1-seeded (unknown in two species). Seed globose-reniform, testa fibrous, embryo curved.—Distrib. Species about 12, natives of the Indian Ocean.

Cymes on peduncles as long as the petioles, bearing numerous crowded sessile flowers 15 in. long ... 1. C. lucida.

Cymes on peduncles slightly longer than the petioles, bearing from 3-5 shortly pedicelled flowers 1 in. long ... 2. C. Scortechinii.

Cymes on peduncles much longer than the petioles, bearing 3 flowers 25 in. long on pedicels as long as themselves ... 3. C. eugenoidea.

1. CARALLIA LUCIDA, Roxb. Hort. Beng. 92; Corom. Plants III, t. 211. A small glabrous tree; young branches thin, dark-coloured when dry. Leaves coriaceous, varying from obovate to elliptic-oblong, oval or oblong-lanceolate; the edges recurved, entire or serrulate in the upper balf or three-fourths, the apex usually shortly cuspidate, the base more or less cuneate; both surfaces shining and reticulate; the main nerves numerous, spreading and interarching freely; length 2.5-3 in., breadth 1-1.75 in., petiole 25-35 in. Cymes axillary and from the axils of fallen leaves, on stout peduncles about as long as the petioles, densely umbellate, usually trichotomous. Flowers 15 in. long, sessile. Calyx-tube cylindric, its mouth with 6 or 7 short triangular incurved teeth. Petals equal in number to the calyx-teeth, orbicular, crenate, clawed, not embracing the stamens. Stamens twice as many as and longer than the petals, the filaments much longer than the ovate anthers. Fruit pisiform, glabrous, pulpy, 1-celled and usually only 1-seeded. Roxb. Fl. Ind. II, 481; Wall. Cat. 4880; Wight Ic. 605; Kurz For. Flora Burma, I, 451. O. integerrima, DC. Prodr. III, 33; Wight Ill. t. 90; 318

Benth. in Journ. Linn. Soc. III, 74; Bedd. Fl. Sylvat. t. CXCIII; Dalz. and Gibs. Fl. Bomb. 96; Brandis For. Flora 219; Hook. fil. Fl. Br. Ind. II, 439. Trimen Flora Ceylon I, 155. C. ceylanica, C. corymbosa, and C. sinensis, Arn. in Ann. Nat. Hist. I, 371. C. ceylanica, Arn. Wight Ill. 211 t. 90. C. timorensis, Blume Mus. Bot. Lugd. Bat. I, 128? C. octopetala, Muell. Fl. Aust. Trop. Occ. ex Benth. in Journ. Linn. Soc. III, 74. C. symmetria, Blume Mus. l. c. 130.

PERAK; very common. SINGAPORE, and probably also in several of the other provinces. DISTRIB. Malayan Archipelago, China, Australia, British India.

DeCandolle's C. integerrima, published in 1828, is in my opinion merely the entire-leaved form of this very common Indian tree, the leaves of which are sometimes serrulate and sometimes entire. It is a tree which Roxburgh could not possibly have overlooked. He published and figured the serrulate-leaved form of it as C. lucida in his Coromandel Plants (1819), having previously given the name in his Hortus Bengalensis, p. 92. In the belief that C. lucida is the oldest name for this plant, I have followed Kurz in restoring it. DeCandolle's name C. integerrima is however adopted by Mr. Bentham, and also by Mr. Henslow who described the Rhizophorew in Hooker's Flora of British India.

CARALLIA SCORTECHINII, King n. spec. A shrub or small tree; young branches slender, opposite, smooth, dark-coloured when dry. Leaves lanceolate or ovate-lanceolate, shortly candate-acuminate, the base slightly cuneate; the edges entire, slightly revolute when dry; both surfaces shining, the lower with sparse black dots and with the numerous spreading main nerves slightly prominent; length 2-2.75 in., breadth 1-1.25 in., petiole 2-25 in. Stipules lanceolate, 25 in. long, caducous. Cymes axillary, on pedicels slightly longer than the petioles, trichotomous, spreading, not crowded. Flowers 3-5, rather more than ·1 in, long and about the same in width at the mouth, on pedicels nearly ·1 in, long and bracteolate at the base. Calyx-tube campanulate, with 5 triangular lobes half as long as itself, their apices slightly inflexed. Petals 5, thin, reniform, erose-crenate, clawed, each embracing a stamen. Stamens 10, inserted on the 10-toothed epigynous disc, unequal. Ovary adnate to the calyx-tube, 5-celled, with 2 axile ovules in each cell. Style stout, as long as the calyx-lobes, stigma 5-lobed. Fruit unknown.

Perak; Scortechini 2023; King's Collector 1013. Singapore; Ridley 5593.

The specimens collected by Scortechini are described by him as taken from a shrub 5 or 6 feet high, while those collected by Mr. Kunstler are noted as from a tree 30-40 feet in height. They resemble each other exactly both in flowers and leaves, and I have no doubt whatever that the two belong to the same species. I give this species a name with considerable hesitation; for it does not differ much from Roxburgh's description of C. lancæfolia. It also closely resembles C. cuspidata, Blume, in leaves, but has larger flowers.

3. CARALLIA EUGENOIDEA, King n. spec. A tall tree; young branches slender, glabrous, reddish when fresh, black when dry. Leaves oblanceolate, the apex sub-acute, the base cuneate, the edges thickened and with black glandular dots, entire; upper surface shining when dry; the lower dull, the 6-8 pairs of spreading main-nerves slightly prominent; length 1.75-2.25 in., breadth 8-1.1 in., petiole 2-25 in. Stipules in pairs, lanceolate, 25 in. long, caducous. Cymes axillary, their peduncles an inch or more in length, bearing at the apex, on pedicels as long as themselves, 3 flowers 25 in. in length. Calyx-tube narrowly campanulate, with 5 triangular lobes as long as itself. Petuls apparently none. Stamens twice as many as the calyx-lobes; the filaments alternately shorter, inserted on the 10-lobed disc. Ovary occupying the tube of the calyx, 5-celled, with 2 nearly pendulous ovules in each cell; stigma 5-lobed. Fruit unknown.

PERAK; Scortechini, 326.

In the externals of the flowers and also in its leaves this has a superficial resemblance to a Eugenia; but the presence of stipules and the structure of the flower show it to be a true Carallia.

# 6. PELLACALYX, Korth.

Trees with bifarious opposite petiolate entire or obscurely serrulate leaves and interpetiolar elongate caducous stipules. Flowers axillary, solitary or in pairs, minutely bracteolate. Calyx ebracteolate, its tube tubular-campanulate, adherent to the ovary at its base; the mouth expanded and with 4-6 short recurved valvate teeth. Petals 4-6, lacerate at the apex, inserted on the margin of the tube of the calyx. Stamens 8-12, incurved, inserted on the margin of the thin crenulated disc lining the calyx-tube. Ovary half-inferior, 5-10-celled. subulate; stigma discoid, 5-10-lobed; ovules many in each cell, fascicled, attached to the axis. Fruit fleshy, sub-globose, 5-10-celled, manyseeded. Seeds ovoid, with striate testa; albumen copious with the embryo in its axis; cotyledons flat, narrow; the radicle terete and elongate. DISTRIB. Two species, both Malayan.

Calyx-tube with 5 or 6 teeth; flowers 5-merous; leaves densely stellate rusty-pubescent beneath ... 1. P. axillaris. Oalyx-tube with 4 teeth; flowers 4-merous; leaves glabrous 2. P. Saccardianus.

1. Pellacatix axillaris, Korth. in Van der Hoev. & De Vr. Tijdsch. III. 20, t. 2. Young branches rusty-pubescent. Leaves thinly coriaceous, oblong, sometimes slightly wider above the middle, the apex shortly and abruptly acuminate, the base rounded; upper surface with a few small scattered sub-stellate hairs, or sub-glabrous when old, the midrib always pubescent; lower surface boldly reticulate and stellately

rusty-pubescent; main nerves about 12 pairs, conspicuous beneath, curving sharply upwards; length 4·5-7 in., breadth 1·25-2 in.; petiole '2-3 in., rusty-pubescent; stipules lanceolate, rusty-pubescent, '35 in. long. Flowers ·25-·35 in. long, on pedicels of about the same length, both rusty-pubescent, Fruit pisiform, fleshy, ·25 in. in diam., crowned by the persistent wide upper part of the calyx. Benth. in Journ. Linn. Soc. III, 76; Griff. Netul. IV, 420; Ic. Pl. Asiat. t. 486.

MAI.ACCA; Griffith 2217/1; Maingay 638. Penang; Griffith; Curtis 937. SINGAPORE; Ridley 6917; Anderson, 81. Perak; Scortechini 119: King's Collector, 1049, 2036.

2. Pellacalyx Saccardianus, Scortechini in Nuov. Giorn. Bot. Ital. XVII, 143. A small tree, young branches rusty-puberulous. Leaves thinly coriaceous, oblong, shortly acuminate, edges entire, base rounded or cuneate; upper surface quite glabrous, shining; the lower dull, paler, slightly reticulate, glabrous or sometimes puberulous near the midrib and nerves; main nerves 7-9 pairs, rather prominent beneath, spreading and curving upwards; length 4-7 in., breadth 1:6-2 in., petiole 25 in. Flowers about 25 in. long, on slightly shorter pedicels, rusty-puberulous. Calyx-tube as in P. axillaris but only 4-cleft. Petals 4, broadly oblong, emarginate, irregularly toothed towards the apex, narrowed and entire at the base. Stamens 8. Ovary usually 9-celled. Fruit as in P. axillaris, but glabrous. Hemsley in Hooker's Ic. Pl. 1546.

This differs from P. axillaris, Korthals, in having glabrous or nearly glabrous leaves with only 7-9 pairs of main nerves, and also in its tetramerous flowers.

PERAK; Scortechini 325. Wray 701, 1328. MALACCA; Maingay 639.

### 7. GYNOTROCHES, Blume.

Trees or shrubs. Leaves coriaceous, shining; stipules deciduous. Flowers small, axillary, fascicled, the peduncles joined in the middle. Calyx ebracteolate, 4-5-partite; segments valvate, reflexed. Petals 4-5, inserted below the margin of an 8-10-lobed perigynous disc, clawed, spathulate, fimbriate-lacerate. Stamens 8-10, inserted on the disc, filaments filiform, anthers small. Ovary superior, adhering by a broad base to the calyx, ovoid-globose, 3-6-angled, 3-6-celled; style columnar, furrowed, conical at the base; stigma peltate, deeply 5-lobed; lobes emarginate, recurved; ovules 4 in each cell, ascending, fascicled. Berry globose, 4-6-celled, many-seeded. Seeds small, obovoid, testa crustaceous and wrinkled, albumen fleshy, embryo terete. Distrib. Species 2, both Malayan.

GYNOTROCHES AXILLARIS, Blume Bijdr. 219. A tree; young branches dark-coloured, smooth. Leaves oblong, or elliptic-oblong to elliptic, tapering to each end; the apex shortly and rather bluntly acuminate,

the edges entire; both surfaces shining, the lower much reticulate; main nerves 9-12 pairs, spreading, curving upwards; length 3.5-5.5 in., breadth 1.25-2.5 in., petiole 25-35 in. Fascicles 6-10-flowered, axillary, shorter than the petioles. Flowers less than 1 in long, the pedicels about as long as the fruit-producing flowers, sub-directions; the stamenbearing flowers with perfect petals, but the ovary and stigma abortive; the flowers with fertile ovaries and with perfect stigmas having imperfect stamens and often abortive petals. Fruit a globular glabrous berry 1-15 in. in diam. Blume Mus. Bot. Lugd. Bat. I, 127, t. XXXI; Miq. Fl. Ind. Bat. Vol. I. Pt. I, 592; Kurz For. Flora Burma, I, 451; Hook. fil. Fl. Br. Ind. II, 440. G. Dryptopetalum, Blume Mus. 1. c. 127; Miq. Fl. Ind. Bat. 1. c. 592. Dryptopetalum coriaceum, Arn. in Ann. Nat. Hist. I, 372. G. reticulata, A. Gray. Bot. Amer. Expl. Expedit. Vol. I, 607? Microtropis coriacea, Wall. Cat. 4338. Casearia? acuminata, Wall. Cat. 7198. Rubiacea, Wall. Cat. 8455.

In all the provinces; common. DISTRIB. The Malayan Archipelago.

### 8. ANISOPHYLLEA, Br.

Trees and shrubs. Leaves exstipulate, distichous, obliquely ovatelanceolate or elliptic, with 3-5 main nerves proceeding from the base (the nervation pinnate in one species), quite entire; the alternate leaves sometimes smaller or minute and stipuliform. Flowers monœcious, minute, in axillary simple or fascicled spikes, ebracteate or minutely bracteolate. Calyx-tube of Q flower ovoid, adnate to the ovary, terete or ribbed; limb 4-fid, lobes erect. Petals 4, small, involute, entire, lobed or lacerate. Stamens 8; filaments short, subulate; anthers small, didymous, usually abortive in the females. Ovary inferior, 4-celled; styles 4, subulate, erect or recurved, stigmas acute or subcapitate; ovules solitary in each cell, pendulous, anatropous. Fruit coriaceous, oblong or pyriform, ribbed or smooth, 1-seeded. Seed pendulous, exalbuminous, testa coriaceous, embryo clavate, cotyledons very small or 0, radicle large. Distrib. Species 10, natives of Tropical Asia and Africa. Leaves dimorphous ...

A. disticha. Leaves aniform :-Flowers apetalous... A. avetala. Flowers with 4 petals :-Petals minute, deltoid 3. A. Gaudichaudiana.

Petals thick, subquadrate, entire or subemarginate A. Griffithii. Petals 3-fid at the apex A. Scortechinii. Petals divided to the very base into narrow seg-

... 6. A. Curtisii.

1. ANISOPHYLLEA DISTICHA, Baill. in Adansonia, XI, 311. A shrub with ferruginous-pilose slender branches. Leaves dimorphous, in two

series: the longer oblong-rhomboid, subfalcate, acute, the base cureate, subsessile, 3-nerved, puberulous or pubescent or sometimes nearly glab. rous on both surfaces, '75-1'5 in. in length and about one-third or onequarter as much in breadth; the smaller set stipule-like, lanceolate and only 25-3 in, long, inserted below the larger and overlapping their bases. Male flowers in short few-flowered axillary fascicles and racemes much shorter than the leaves, '05 in. in diam., on short pedicels; calyx with 4 broad lobes; petals shorter than the calyx, trifid; stamens 8, as long as the petals. Female flowers solitary, larger than the males, subsessile; calyx-tube elongated, tubular, pubescent externally, connate with the ovary, crowned at the apex with 4 triangular lobes: netals and stamens as in the male: styles stout, shorter than the netals, truncate: stiamas 2-lobed: fruit narrowly elliptic, tapering to each end, with 8 vertical grooves, glabrous; seed oblong. Hook. fil. in Herb. Kew: Hensl. in Hook. fil. Fl. Br. Ind. II, 442. Anisophyllea trapezoidalis, Baill. in Adansonia, XI, 311. Anisophyllum trapezoidale, Baill, in Adansonia, III, 24, 26. Haloragis disticha, Jack Mal. Misc. VII, 19; Wall. Cat. 2519; Hook. Journ. Bot. I, 371; Calc. Journ. Nat. Hist. IV. 336.

In all the provinces except the Andamans and Nicobars; common. DISTRIB. The Malayan Archipelago.

The name Anisophyllea was first given to this genus by Robert Brown, who however published no description of it. In 1828, Sabine (in a paper published in the Trans. Hort. Soc. Lond.) first used it in giving a popular description of a plant from Sierra Leone under the name A. laurina. Overlooking this publication, Don founded for that very plant the genus Anisophyllum, and named it Anisophyllum laurinum, and this name was published in 1849 in Hooker's Niger Flora, 342. In the addenda and corrigenda to that volume, Don's name is however reduced and Brown's is restored. Baillon (in Adansonia 111, 24 and 36,) applied the generic name Anisophyllum to three plants of which the present species is one. But, in a subsequent volume of Adansonia (XI, 310 and 378) and in his Histoire des Plantes (VI, 304), Baillon abandons Don's name Anisophyllum and adopts Brown's earlier one.

2. Anisophyllea apetala, Scortechini MSS. in Herb. Calcutt. A tree 30-40 feet high; young branches slender, glabrous. Leaves membranous, oblong to elliptic or ovate-elliptic, or elliptic-lanceolate, candate-acuminate, the base rounded or slightly cuneate; both surfaces glabrous, minutely reticulate; the upper shining, the lower somewhat dull when dry; main nerves 5, springing from the apex of the petiole, the middle three bold, the two lateral rather faint; length 3-8 in., breadth 1.25-3 in., petiole 25-3 in. Racemes in lax few-branched extra-axillary panicles as long as the leaves, the rachises glabrous. Flowers monocious, depressed-globular, usually tetramerous, sometimes (fide Scortechini) pentamerous. Male flowers on pedicels longer than

themselves; calyx deeply cut into 4 (rarely 5) triangular thick concave segments; petals none; stamens 4, exserted, the filaments dilated at the base; styles and ovary rudimentary. Female flowers on the same branches as the males, sessile; calyx-tube slightly elongated, the lobes of the mouth smaller than in the male, staminodes shorter than the calyx-lobes; ovary tetragonous, included in the calyx-tube, the styles exserted; fruit ovoid or elliptic, tapering to each end, glabrous, with vertical purple stripes, 2-3 in long and 1-1·25 in in diam.; pericarp woody, thick.

PHRAK; Scortechini, 684 and 1808; Wray 2340, 2758; King's Collector 2932, 4326, 4792, 6587, 6318, 7399.

This resembles A. Gaudichaudiana, Baill. in the shape of its leaves which are, however, much thinner in texture and more caudate-acuminate. It differs from that, however, in having apetalous flowers, and in the males having longer pedicels. The fruit also differs, being pointed at each end and quite glabrous, whereas the fruit of A. Gaudichaudiana is obtuse at the ends and rusty-pubescent.

3. Anisophyllea Gaudichaudiana, Baill. in Adansonia, XI, 311. A tree 50-80 feet high; young shoots rather slender, glabrous, minutely lenticellate. Leaves coriaceous, broadly oblong to elliptic-oblong, entire, shortly and rather bluntly acuminate, the base rounded or slightly narrowed; both surfaces glabrous, dull when dry, with wide reticulations and 5, rarely 7, bold vertical curving main nerves springing from the apex of the petiole, the transverse connecting veins distinct; length 6-10 in., breadth 2.5-4 in.; petiole .25-3 in., stout, channelled, articulate at the base. Panicles axillary, solitary or in fascicles, much shorter than the leaves, with few short distant spicate rusty adpressed-pubescent branches. Flowers monœcious. The males depressed-globose, mostly about 05 in. in diam., on short pedicels; calyx of 4 triangular concave fleshy segments; petals deltoid, much smaller than the calyx-lobes. stamens 8, incurved, pistil rudimentary. Female flowers sessile, longer than the males; the calyx-tube elongate, tubular, containing the ovary, its mouth with segments like the male; stamens none; styles 4, recurved. Fruit large, subpyriform or ellipsoid, sub-oblique, obtuse, minutely rusty-pubescent, 3.5 in. long, and 2.25 in. diam.; pericarp woody, 5 in. thick. Seed solitary. Hook. Ic. Plant. 1551. A. grandifolia, Hensl. in Hook, fil. Fl. Br. Ind. II, 442. Cocculus?? flavicans, Wall. Cat. 4976. Strychnos? grandis, Wall. Cat. 4454. Anisophyllum flavicans, Hook. & Thoms. Fl. Ind. 175. A. grande, Benth. in Journ. Linn. Soc. I, 79.

Penang, Gaudichaud, Maingay 1517, Curtis 521, Stolickza. Perak; King's Collector 2706, 2731, 5472; Ridley 3029.

On the principle by which Herr Otto Kuntze desires to guide botanical nomenclature Baillon's name A. Gaudichaudiana would have to give way to the name A. grandis, because, although Wallich referred the plant to a family with which it has no affinity, he gave it the earliest specific name "grandis."

4. Anisophyllea Griffithii, Oliver in Trans. Linn. Soc. XXIII; 460. t. 48. A tree 40-50 feet high, with drooping branches; young branches slender, glabrous. Leaves thinly coriaceous, greenish-yellow when dry, lanceolate, ovate-lanceolate or broadly elliptic-lanceolate, the apex bluntly acuminate, the base cuneate, the edges entire and slightly revolute when dry; both surfaces glabrous and very minutely dotted, the upper shining, the lower rather dull; length 2.5-3.5 in., breadth 1.2-2 in., petiole 15-2 in.; a basal nerve springing from the apex of the petiole on each side and running close to the edge; main nerves pinnate. about 6 pairs, oblique, curving but slightly. Spikes solitary or in pairs, axillary or extra-axillary, slender, tawny-puberulous, '75-1 in. long. (1.5-2.75 in., fide Oliver), laxly-flowered. Male flowers :05 in. in diam., sessile; calyx-limb with 4 triangular coriaceous lobes; petals 4, shorter than the calyx-lobes, thick, broadly-oblong, subquadrate, entire or faintly emarginate; stamens 8, the 4 opposite to the petals attached to the latter, filaments dilated, anthers broadly-elliptic; styles 4, free, subulate, ovary imperfect. Female flowers like the males, but the calyx-tube elongated and containing the 4-celled ovary. Fruit globularellipsoid, obtuse at each end, glabrous, smooth, 1.75 in. long and 1.35 in. in diam. Laws. in Hook. fil. Fl. Br. Ind. II, 442.

MALACCA; Griffith 2439. PENANG; Curtis 148 and 1511. PERAK; King's Collector 7600.

This differs from all other Malayan species in the pinnate venation of its leaves. There are indeed two nerves which spring along with the midrib from the apex of the petiole and run round the edges, but the midrib has pinnate branches.

5. Anisophyllie Scortechini, King n. spec. A tree 25-30 feet high; young branches slender, rusty-tomentose. Leaves falcately lauceolate-rhomboidal, the apex much acuminate, the base obliquely acute; both surfaces shining, the upper quite glabrous, the lower glabrous except for a few thin scattered brown apically-directed adpressed hairs on the intercostal spaces; the nerves (and particularly the middle one) more pubescent, especially towards the base; main nerves 3, 4 (from the splitting of the middle one) or rarely 5, springing from the apex of the petiole, the middle one straight, the two lateral curved; all prominent on the lower and deeply depressed on the upper surface; connecting veins sub-horizontal, prominent; length 2.5-3 in., breadth 6-1.25 in., petiole 15 in. Panicles extra-axillary, with only 1 or 2 branches, 5-1 in. long, rusty-pubescent. Male flowers 1 in. in diam., on pedicels as long as themselves, minutely bracteolate at the base; calyx-lobes 4 or 5, broadly ovate-acute, not concave, reflexed; petals

shorter than the calyx-lobes, 3-fid at the apex; stamens 8; styles 4, conical, rudimentary. Female flower larger than the male and with the calyx-tube elongated and containing the ovary; lobes of the mouth broadly ovate; stamens 8; rudimentary styles 4, stout, as long as the calyx-lobes; stigmas sub-capitate. Fruit ellipsoid, glabrous, 75 in. long and 4 in. in diam., glabrous, smooth; the pericarp woody.

PERAK; Scortechini 1807. Wray 960 and 2100; King's Collector

5681, 8821.

A species closely allied to the Bornean A. rhomboidea, Baill. The latter species has however leaves of thinner texture, and their main nerves are more pubescent beneath while, instead of being deeply depressed on the upper surface, they are scarcely visible. The transverse veins are also finer and less visible than in the leaves of this, while the lower surface has numerous minute white scales; the leaves of this have no scales. The petals of A. rhomboidea are described by Baillon as flabellate-incised.

6. ANISOPHYLLEA CURTISH, King n. spec. A tree 30-40 feet high with drooping branches; young twigs slender, deciduously and sparsely adpressed rusty-pubescent. Leaves thinly coriaceous, elliptic-lanceolate, slightly oblique especially towards the rather abruptly and obliquely cuneate base, gradually tapering to the caudate-acuminate apex; upper surface glabrous, not reticulate; the lower faintly reticulate, glabrous except for a few adpressed hairs near the base; main nerves 5, springing from the apex of the petiole, the two outer faint and running close to the edge, the three middle prominent on the lower surface but obsolete on the upper; length 2.5-3.25 in., breadth 8-1.25 in., petiole 2 in. Male and female flowers on distinct adpressed-pubescent spikes about 5 in long, each flower with a short blunt bracteole at its base. Male flowers 15 in. long, sessile, clavate; calyx-tube elongate, rusty adpressed-pubescent externally, its mouth with 4 broadly triangular lobes: petals 4, as long as the calyx-lobes or longer, cut almost to the base into filiform lobes; stamens 8, with filaments of unequal length, those with short filaments attached to the petals; styles subulate, ovary abortive. Female flowers 25 in. long, the calyx-tube longer than in the male and ribbed; lobes of the mouth reflexed. Petals as in the male but larger and with more lobes; stumens as in the male; style as long as the petals. Fruit unknown.

PENANG: Curtis 746.

A very distinct species, at once recognised by its comparatively large flowers and deeply fimbriate petals; allied to A. rhomboidea, Baill. and to A. Scortechinii, King; but well distinct from either.

# ORDER XLV. COMBRETACEÆ.

Trees or shrubs, often climbers. Leaves alternate subopposite or 326

opposite, sometimes ternate, petioled, entire, simple (in Illigera 3-foliolate); stipules 0. Flowers bracteolate at the base, in the tribe Gyrocarpeæ cymose; in the Combreteæ spicate or racemose (the racemes often panicled); often polygamo-monecious. Calyx-tube adnate to the ovary and produced above it (sometimes to a great length), the limb of 4-5 (rarely 4-7) valvate lobes. Petals 4-5 or 0, (rarely 6-7). Stamens 4-5 or 8-10, inserted on the calyx; (in the Gyrocarpeze the filaments with staminodes attached at the base, and the anthers dehiscing by recurved lateral valves). Ovary inferior, 1-celled; style simple; stigma simple or in Illigera sinuate, almost lobed; ovules 1-7 (usually 2-3), pendulous from the apex of the cell. Fruit coriaceous or drupaceous, generally indehiscent, ovate, angular or very commonly winged; in Calycopteris and Gyrocarpus crowned by the greatly enlarged calyx. Seed 1, without albumen; cotyledons in Terminalia and others convolute; in Combretum and others plano-convex. DISTRIB. Species about 320, in the tropics of the whole world; and in S. Africa outside the tropics.

Sub-Order I. Combreter. Calyx-lobes valvate; stamens without basal glands or staminodes; the anthers with longitudinal dehiscence. Ovules 2-7, suspended by long funicles. Flowers in spikes or racemes:—

Flowers apetalous :-

Limb of the calyx deciduous ... ... 1. TERMINALIA.
Limb of the calyx accrescent ... 2. Calycopteris.
Flowers with 4 or 5 petals (except in Combretum apetalum):—

Limb of the calyx persistent, leaves alternate ... 8. LUMNITZERA.
Limb of the calyx deciduous, leaves opposite:—

Calyx-tube prolonged above the ovary for less than

Calyx-tube prolonged above the ovary for from 75-25 in... ... ... 5. Quisqualis.

Sub-Order II. Gyrocarpe. Calyx-lobes valvate or imbricate; stamens with glands or staminodes at their bases; anthers dehiscing by up-turned valves. Ovule 1, suspended by a short funicle. Flowers cymose:—

Scandent; leaves 3-foliolate ... ... 6. ILLIGERA.

Trees; leaves entire ... ... 7. Gyrocarpus.

# 1. TERMINALIA, Linn.

Large trees. Leaves alternate or subopposite, exstipulate, entire or slightly crenulate, often with glands on the petiole or near the base of the midrib beneath. Flowers small, spicate, (the spikes sometimes panicled), hermaphrodite, the upper flowers on the racemes often males and the lower hermaphrodite; a narrow deciduous bract at the base of each flower. Calyx-tube produced above the ovary, having a campanulate

COMBRETUM.

mouth with 5 short valvate triangular lobes, deciduous. Petals 0. Stamens 10, inserted on the calyx-tube; the epigynous disc within them densely hairy. Ovary 1-celled, inferior; style long, simple; ovules 2 or 3, pendulous from the summit of the cell. Fruit ovoid, various in size and texture, smooth or angular, or with 2-5 wings, indehiscent, Seed solitary, exalbuminous, cotyledons convolute. DISTRIB. coriaceous. Species 135; in the tropics of both worlds.

SECT. I. Fruit ovoid or elliptic, sometimes compressed, never winged, but sometimes keeled at the edges or obscurely 4-5-ridged :--

Leaves broadly oblong, lanceolate-oblong to elliptic-oblong; fruit sub-clavate, obscurely 5-ridged, glabrous, 2-3 in. long Leaves elliptic or ovate, acuminate; fruit oblong, obscurely 5-ribbed, slightly compressed on one side, 6-75 in. long, Leaves obovate, broadly elliptic or sub-rotund, minutely papillose on the upper surface, the petioles very long (1.75-4 in.); fruit ovoid or globular-ovoid, minutely tomentose ... 3. T. belerica. Leaves obovate, tapering to a very narrow base; fruit glabrous :-Fruit elliptic, 2.25 in. long, with very thick corky peri-

carp; leaves 3-4 in. long Fruit obovate-ellipsoid, plano-convex, 1.5 in. long; leaves 5-6.5 in. long... Fruit ellipsoid, somewhat compressed, keeled at the

edges, 2 in. long; pericarp fleshy; leaves 6-9 in. long SECT. II. Fruit narrowly elliptic, its edges produced into 2 broad leathery wings:-

Leaves obovate or oblong-obovate, 6-9 in. long, the petioles 2 25-2 75 in.; fruit 1 25-1 75 in. long, its breadth (including the wings) 2.5-3.5 in. ... Leaves spathulate-oblanceolate, 3-4 in. long, the petioles 1.15-1.5 in.; fruit .75-1.25 in. long; its breadth (including

the wings) 1.2-2 in. 1. TERMINALIA CITRINA, Fleming in Asiat. Res. XI, 183. A glabrous tree 60-80 feet high; young shoots slender, rusty-pubescent, but at an early stage glabrous. Leaves thinly coriaceous, sometimes almost opposite, from broadly oblong-lanceolate to elliptic-oblong, on short bi-glandular petioles, the apex acute or shortly acuminate, the base cuneate or sometimes rounded; both surfaces when very young rusty-puberulous, afterwards perfectly glabrous and shining, the lower minutely areolate-reticulate, the bottom of the areolæ covered with white felt; main nerves 8-12 pairs, curving upwards, distinct on both surfaces when dry; length 3-6 in., breadth 1.25-2.5 in., petiole '4 or '5 in. Spikes in small panicles shorter than the leaves, axillary, deciduously rusty-puberulous.

1. T. citrina.

T. Manii.

T. phellocarpa.

T. fætidissima.

6. T. Catappa.

7. T. bialata.

T. subspathulata.

Flowers '2 in. in diam., sessile, all hermaphrodite, each with a deciduous linear bracteole. Calyx glabrous outside, rusty-villous inside, the tube oblong; glands 5, rusty-woolly. Drupe oblong-lanceolate, slightly clavate, smooth, glabrous, obscurely 5-ridged, 2-3 in. long, and '75-1 in. in diam. Roxb. Hort. Beng. 33; Fl. Ind. II, 435; Wall. Cat. 3970; DC. Prodr. II, 12; Miq. Fl. Ind. Bat. I, pt. I, 602; Kurz For. Flora Burma, I, 456; Clarke in Hook. fil. Fl. Br. Ind. II, 446; W. & A. Prodr. 313; Brand. For. Fl. 223. Myrobalanu citrina, Gaertn. Fruct. II, t. 97.

BRITISH INDIA.

VAR. 2. malayana, Clarke in Hook. fil. Fl. Br. Ind. II, 447. Petioles 75-1.25 in. long. Fruit about 1 in. long.

NICOBAR ISLANDS; Jelinek, Kurz. Malacca; Griffith 2178. Maingay 643. Perak; King's Collector 3173.

This species and its variety malayana may be readily distinguished from T. Chebula, Retz (which in many respects it resembles) and from every other Asiatic Terminalia by the peculiar areolate reticulation of the under surface of the leaves.

TERMINALIA MANII, King n. spec. A tree 20-40 feet high; young shoots slender, deciduously rusty-puberulous, lenticellate. Leaves thinly coriaceous, almost opposite, not crowded, scattered, elliptic or ovate, shortly and rather abruptly acuminate, the base rounded or somewhat cuneate and slightly oblique; both surfaces glabrescent or glabrous, minutely reticulate, the reticulations on the lower tesselate; main nerves 9-12 (rarely 14) pairs, spreading, curving upwards at the tips; length 3.25-6.5 in., breadth 2-3 in.; petiole .75 in, long, often with 2 sessile oblong glands at the sides near its apex. Panicles lateral and terminal, with numerous spike-like rusty-puberulous ultimately glabrous branches shorter than the leaves when in flower, longer when in fruit. Flowers ·15 in. in diam. at the mouth, each subtended by a linear puberulous bracteole as long as itself. Ovary narrow, cylindric, thickened and pubescent towards the base, the upper half and the mouth glabrous outside; the mouth cupular with inconspicuous broad shallow teeth, woolly inside. Stamens exserted, glabrous. Fruit oblong, tapering a little to each end, slightly compressed on one side, obscurely 5-ridged, quite glabrous, 6-75 in. long, and 3-35 in. in diam.; pericarp crustaceous, hard, thick.

NICOBAR and ANDAMAN ISLANDS; King's Collectors.

Named in honour of Mr. E. H. Man, C. I. E., Deputy Superintendent of the Andaman and Nicobar Islands, whose powerful help has made it possible to explore the Forests of these most interesting islands; a species of which the nearest ally is probably *T. citrina*, Roxb.

3. TERMINALIA BELERICA, Roxb. Fl. Ind. II, 431. A tall tree.

Leaves clustered at the apices of the branches, coriaceous, ohovate. broadly elliptic or sub-rotund, the petioles long; the apex usually broad and rounded, rarely subacute; the base slightly cuneate, sometimes slightly unequal; both surfaces puberulous when young, glabrous and reticulate when old, the upper with numerous minute papillæ; main nerves 6-8 pairs, spreading, prominent, the midrib prominent on both sides and sometimes with 2 glands near the sides of its base; length 4.5-8 in., breadth 3.5-4.75 in, petiole 1.75-4 in. Spikes axillary, slender, longer than the petioles, shorter than the leaves, rusty-pubescent. Flowers about 25 in. in diam., those in the upper part of the spike male, those in the lower hermaphrodite. Calyx-tube short, stout, including the ovary, minutely tomentose, the mouth with broad triangular lobes, pubescent outside, densely villous inside. Stamens much exserted. Drupe ovoid or globular-ovoid, densely covered with minute pale tomentum, when dried obscurely 5-angled, 1 in. long and 75 in. in diam. W. & A. Prodr. 313 (excl. syn.); Wall. Cat. 3963; Wight Ic. t, 91; Thwaites Enum. 103; Dalz. & Gibs. Bomb. Fl. 91; Brand. For. Fl. 222; Kurz For. Fl. Brit. Burma I, 455; Hook. fil. Fl. Br. Ind. II, 445; Bedd. Fl. Sylvat. t. 19; Trimen Fl. Ceyl. I, 159. T. Gella, Dalz. in Hook. Kew Journ. III, 227. T. punctata, Roth Nov. Sp. 381; DC. Prodr. III. 13. T. eglandulosa, Roxb. Herb. (wrongly referred in Willd. Sp. Pl. IV, 968). T. moluccano, Roxb. Hort. Beng. 33; Fl. Ind. II, 432.

PERAK; Scortechini 1684; King's Collector 8778. DISTRIB. British India.

Roxburgh describes and figures (Corom. Plants t. 198; Fl. Ind. II, 431) a form of this with two glands at the apex of the petiole on the under surface of the leaf; but this form has not hitherto been collected in any Malayan country, and its occurrence in British India must be rare.

4. TERMINALIA PHELLOCARPA, King n. sp. A tree; young branches rather slender, deciduously rusty-tomentose. Leaves crowded near the apices of the branches, coriaceous, obovate, blunt, tapering from above the middle to the petiole, slightly oblique at the base; both surfaces glabrous and shining, the lower widely reticulate and minutely dotted; main nerves 4-6 pairs, spreading but curving upwards; length 3-4 in., breadth 1.75-2 in.; petiole about 8 in., thickened towards the base, rusty-pubescent. Flowers unknown. Fruit elliptic, blunt at each end, 2.3 in. long, breadth 1.5 in.; the apex with a short sharp mammilla .15 in. long, the pericarp thick, spongy, with horizontal layers of fibrous tissue, the endocarp woody.

SINGAPORE; on Bukit Mandai, H. N. Ridley.

This has been collected only once, and the specimens are without flowers. I have named it from its corky fruit. In its leaves this greatly resembles the Philippine species T. nitens, Presl; but that has a very much smaller fruit than this; more-

over the petioles of its leaves are glabrous, whereas in this the petioles are pubesent.

5. Terminalia fortidissima, Griff. Notul. IV, 685. A tall tree; young branches as thick as a swan's quill, puberulous, rather rough. Leaves coriaceous, obovate, minutely cuspidate, narrowed from above the middle to the acute base; upper surface quite glabrous, very shining when dry the lower duller, glabrous except the sparsely rusty-pubescent midrib and nerves; main nerves 7-9 pairs, spreading but curving upwards; length 5-65 in., breadth 2·25-3·25 in.; petiole about '8 in., terete. Spikes solitary, axillary, nearly as long as the leaves, rusty-pubescent. Flowers nearly all hermaphrodite, about '2 in. in diam.; their ovaries elongate, clavate, rusty-tomentose, each with a linear bracteole. Calyateeth sparsely hairy, the mouth rusty-villous inside. Drupe obovate-ellipsoid, subacute, plano-convex, glabrous when ripe, 1·5 in. long. Clarke in Hook. fil. Fl. Br. Ind. II, 445.

MALACCA; Griffith, Maingay 6431 and 644. DISTRIB. Burma.

6. TERMINALIA CATAPPA, Linn. Mant. II, 519. A tree 80-120 feet high; young branches stout, puberulous, becoming glabrous, the tips with large cicatrices. Leaves coriaceous, obovate or obovateoblong, with a much attenuate cordate and often bi-glandular base; the petiole very short, stout, broad and channelled; both surfaces glabrous; main nerves 8-12 pairs, spreading, not prominent when dry: length 6-9 in., breadth 3.5-5 in., petiole 35 in. Spikes axillary, slender, glabrous, shorter than the leaves. Flowers 2 in. in diam., each with a small bracteole, those in the upper part of the raceme mostly male and shortly pedicelled, those in the lower part hermaphrodite; calvxtube containing the ovary, conical. Calyx glabrous outside, the mouth villous inside. Ovary glabrous. Drupe ellipsoid, somewhat compressed, keeled all round, pointed at the base, glabrous; pericarp pulpy, endocarp woody and very hard; length 2 in., breadth 1.25 in. Willd. Sp. Pl. IV. 967; Roxb. Hort. Beng. 33; Fl. Ind. II, 430; Lamk. Ill. t. 848; DC. Prodr. III, 11; Wall. Cat. 3975; W. & A. Prodr. 313; Wight Ic. 172; Bot. Mag. 3004; Miq. Fl. Ind. Bat. I, pt. I, 599; Bedd. Fl. Sylv. t. 18; Kurz For. Fl. Brit. Burma, I, 454; Hook. fil. Fl. Br. Ind. II, 444. T. Catappa and T. Badamia, Tulasne in Ann. Sc. Nat. Ser. IV, Vol. VI. 92. T. moluccana, Lamk. Diet. I, 349, (not of Roxb.); DC. Prodr. III. 11; Willd. Sp. Pl. IV, 96 (excluding the synonym T. eglandulosa, Roxb.) T. procera, Roxb. Hort. Beng. 33; Fl. Ind. II, 249; Wall. Cat. 3974; Kurz For. Flora Burma, I, 454. Terminalia nov. spec. 168, Kurz in Journ. As. Soc. Beng. 1876, pt. II, p. 130. T. Myrobalana, Roth Nov. Sp. 378. T. subcordata, Willd. Sp. Pl. IV, 968. T. intermedia, Spreng. Syst. II, 359. Juglans Catappa, Lour. Fl. Cochineh. 703. Catappa domestica, C. litorea and C. sylvestris, Rumph. Herb. Amboin. I, t. 68. Badamia Commersoni, Gaertn. Fruct. II, 97; Rheede Hort. Mal. IV, t. 3, 4.

In all the provinces; near the coast.

A magnificent species, at times attaining an enormous height, and usually with horizontal branches. The stem is frequently most picturesquely butressed. The embryo is eatable, and is often known to Europeans in the East as the "Indian Almond." I have reduced to this T. procera, Roxb., the only tangible distinction between which and T. Catappa is said to be its obscurely 5-ridged fruit. But fruits with this peculiarity may be gathered from the same trees as those bearing the ordinary sharp-edged smooth fruit.

7. TERMINALIA BIALATA, Steud. Nomencl. II, 668. A glabrous tree 80-100 feet high; young branches stout and with large cicatrices. Leaves crowded at the apices of the branches, alternate, thinly coriaceous, obovate or obovate-oblong, with long petioles, the apex abruptly and shortly cuspidate, narrowed from above the middle to the cuneate and usually oblique base; upper surface shining when dry, the lower dull and paler, the reticulations rather distinct on both; main nerves 7-9 pairs, spreading, rather distinct on both surfaces when dry; length 6-9 in., breadth 2.75-4.5 in., petioles 2.25-2.75 in. Spikes axillary, drooping, solitary, longer than the petioles but rather shorter than the leaves, rusty-puberulous. Flowers 2 in. in diam., sessile, the male flowers in the upper part, the hermaphrodite flowers in the lower, each with a minute deciduous bracteole. Calux rusty-pubescent outside, densely rusty-villous inside; the lobes triangular, reflexed. Stamens exserted. Ovary villous. Fruit ellipsoid, tapering to each end, somewhat flattened on one side, covered with minute dense rusty tomentum and with 2 large slightly wavy, coriaceous, puberulous, horizontally striate lateral wings; length of fruit 1.25-1.75 in., breadth 5-75 in., the wings from 1.25-1.75 in. in width. Kurz For. Flora Burma, I, 456; Clarke in Hook. fil. Fl. Br. Ind. II, 449. Pentaptera bialata, Roxb. Hort. Beng. 34; Fl. Ind. II, 441; Wall. Cat. 3986.

Andaman, and probably also the NICOBAR ISLANDS. DISTRIB. Burma.

8. Terminalia subspathulata, King n. spec. A tree over 100 feet high; young branches rather slender, deciduously puberulous. Leaves alternate, crowded near the ends of the branches, coriaceous, spathulate-oblanceolate, shortly and bluntly cuspidate, tapering from near the apex to the long petiole, eglandular and sometimes slightly oblique at the base, the edges thickened and slightly revolute; upper surface glabrous and shining, the lower pale and sub-glaucous, both minutely reticulate; main nerves about 8 pairs, spreading and curving upwards, distinct; length 3-4 in., breadth near the apex 1-16 in., petiole 1:15-1:5 in. Spikes solitary, axillary, shorter than the leaves when in flower, longer

when in fruit, rusty-pubescent. Flowers '15 in. in diam., those in the upper part of the spike male, those in the lower hermaphrodite. Calyx minutely rusty-pubescent outside; the tube narrow, sub-cylindric in the female, tapering much upwards; the mouth wide, cupular and with 5 broadly triangular shallow reflexed teeth, shortly lanate at the base. Stamens exserted. Fruit narrowly elliptic, cylindric at the ends, '75-1'25 in. long; the edges produced into 2 coriaceous, horizontally striate, glabrous wings each '6-1 in. wide.

SINGAPORE; Ridley 5733. MALACCA; Derry 1037. Perak; King's Collector 4529.

### 2. CALYCOPTERIS, Lamk.

A diffuse sub-scandent shrub with drooping branches. Leaves opposite, shortly petioled, elliptic or ovate, acuminate, entire. Racemes dense, axillary, and crowded towards the ends of the branches so as to form large panicles. Flowers small, greenish, each with a lanceolate bract. Calyx-tube 5-striate, produced above the ovary; limb 5-fid, persistent and much enlarged in fruit. Petals O. Stamens 10, the five upper ones between the calyx-teeth, the five others alternate with them and lower down on the calyx-tube. Ovary 1-celled, inferior; style subulate, simple; ovules 3, pendulous from the top of the cell. Fruit narrowly ovoid, 5-ribbed, villous, 1-seeded, surmounted by the enlarged calyx. Cotyledons convolute. The only species.

CALYCOPTERIS FLORIBUNDA, Lamk. Dict., Suppl. II, 41, and Ill. t. 357. A diffuse scrambling shrub, sub-scandent; young branches slender, puberulous. Leaves sub-coriaceous, ovate-lanceolate to ovate-oblong. sometimes shortly acuminate, the base rounded or slightly narrowed: both surfaces minutely tomentose, the upper tawny, the lower rusty and pitted; main nerves 5 or 6 pairs, ascending, curved, rather prominent beneath; length 2.5-4 in., breadth 1-2 in., petiole 2-3 in. Inflorescence rusty-tomentose. Flowers 35 in. in diam., sessile, yellowish-green, each with a short lanceolate pubescent bracteole. Stamens unequal, but all much shorter than the linear-lanceolate calyx-lobes. Fruit about 35 in. long, narrowly oblong, 5-angled, crowned by the enlarged veined calyx-lobes which often attain from '75-1 in. in length. Braudis For. Flora 220; Clarke in Hook. fil. Fl. Br. Ind. II, 449. Calycopteris nutans, Kurz Journ. As. Soc. Beng. Vol. XLVI, pt. II, p. 59; For. Flora Burma, I, 468. Getonia floribunda, Roxb. Cor. Pl. t. 87 and Fl. Ind. II, 428; Roth Nov. Sp. 216; DC. Prodr. III, 15; Dalz. & Gibs. Bomb. Fl. 91; Miq. Fl. Ind. Bat. I, pt. I, 605; W. & A. Prodr. 315; Wall. Cat. 4013. Getonia nutans, Roxb. Hort. Beng. 33; Fl. Ind. II, 428; Wall. Cat. 4012; Miq. l. c.; DC. Prodr. III, 15. Getonia nitida, Roth Nov. Sp. 217. Combretum sericeum, Wall. in Herb. Calc.

PENANG; Wallich. SINGAPORE; Lobb. TRANG; King's Collector.
ANDAMANS; King's Collector. DISTRIB. British India.

There is a variety of this, with glabrous leaves and with the longer stamens equalling the calyx-lobes, to which Kurz has given the varietal name floribunda, his name for the typical form being C. nutans. I have seen no specimens of the glabrous variety from any of the Malayan provinces.

### 3. LUMNITZERA, Willd.

Large glabrous shrubs or small trees, growing in tropical salt marshes along with Mangroves and closely resembling them in habit. Leaves clustered towards the ends of the branches, alternate, thickly leathery, subsessile, narrowly obovate, entire or scarcely crenate. Flowers in racemes. Calyx-tube with two adnate bracteoles near the base, oblong, narrowed at both ends, produced above the ovary; lobes 5, persistent. Petals 5, oblong. Stamens 10 in two series, or fewer. Ovary inferior, 1-celled; style subulate, simple; ovules 2-5, pendulous from the top of the cell. Fruit woody, elliptic-oblong,  $\frac{1}{2}$ -1 in. (including the calyx-limb), longitudinally striate or nearly smooth. Seed 1; cotyledons convolute.—Distrib. Species 2; on the shores of the tropics of the Old World and of Polynesia.

Petals scarlet; stamens twice as long as the petals and of the same colour ... ... ... ... ... 1. L. coccinea.

Petals white; stamens of the same colour and length as the petals ... ... ... ... 2. L. racemosa.

1. Lumnitzera coccinea, W. & A. Prodr. 316. A small tree 12-40 feet high. Leaves oblanceolate, obtuse, 2-3 in. long. Racemes terminal, sometimes several together forming a panicle. Petals scarlet, '25 in. long. Stamens 5-10 (usually 7), twice as long as the petals and of the same colour. Miq. Fl. Ind. Bat. I. pt. I, p. 606; Clarke in Hook. fil. Fl. Br. Ind. II, 452. L. littorea, Voigt Hort. Suburb. Calc. 39 Kurz For. Fl. Brit. Burma, I, 469. L. pentandra, Griff. Notul. IV, 684, and Ic. Pl. Asiat. t. 644. Pyrranthus littoreus, Jack Mal. Misc. II, 57; Wall. Cat. 4018.

ANDAMAN ISLANDS. PERAK; King's Collector 1180; Scortechini 1001; and probably in the Mangrove swamps of all the provinces; DISTRIB. British India, the Malayan Archipelago, North Australia and Polynesia.

2. Lumnitzera racemosa, Willd. in Ges. Naturf. Fr. Neue Schr. IV, (1803), 187. A small tree 20-40 feet high. Leaves oblanceolate to eval, obtuse, 1-3 in. long. Racemes axillary, elongating in fruit. Petals minute, white. Stamens 5-10, about as long as the petals and also white. DC. Prodr. III, 22; W. & A. Prodr. 316; Miq. Fl. Ind. Bat. I; pt. I, 606; Dalz. & Gibs. Bomb. Fl. 90; Tulasne in Ann. Sc. Nat. Ser. IV, Vol. IV, p. 103; Bedd. Fl. Sylv. Pl. XXI; Brand. For. Fl. 221;

Kurz For. Fl. Brit. Burma I, 468; Clarke in Hook. fil. Fl. Br. Ind. II, 452. Pyrranthus albus, Wall. Cat. 4019. Petaloma alternifolia, Roxb. Fl. Ind. II, 372. Bruguiera madagascariensis, DC. Prodr. III, 23. Rheede Hort. Mal. VI, t. 37.

In Mangrove-swamps in all the Provinces. DISTRIB. British India, the Malayan Archipelago, North Australia and Polynesia.

### 4. COMBRETUM, Linn.

Shrubs with long pendent or scandent branches. Leaves entire, petioled, opposite or more seldom alternate or ternate. Flowers hermaphrodite or polygamo-diœcious, in spikes or panicles, bracteoles small. Calyx-tube constricted above the ovary, short or long-produced, urceolate funnel-shaped tubular or campanulate; limb 4-5-lobed, deciduous. Petals as many as the calyx-lobes, (0 in C. apetalum), placed on the calyx-limb. Stamens twice as many as the petals, inserted in two series with them. Ovary inferior, 1-celled; style 1, subulate, simple; ovules 2-5, pendent from the top of the cell. Fruit with 4-5 wings angles or ridges, dry, generally indehiscent. Seed 1; cotyledons plaited or flat, in a few species convoluted. Distrib. Species 160, common in the tropics of America, Africa and Asia; also in South Africa.

ropics of America, Africa and Asia; also in South A	LLICE	a.
Flowers 5-merous; fruit 5-angled	1.	C. trifoliatum.
Flowers 4-merous; fruit 4-angled	2.	C. tetralophum.
Flowers 4-merous; fruit 4-winged:-		
Tube of calyx much elongate; flowers not squamose, buds		
ellipsoid, their apices very much pointed :-		
Flowers condensed in globose masses at the ends of the		
branches of the panicle	3.	C. sundiacum.
Flower-spikes elongated	4.	C. extensum.
Tube of calyx long; flowers squamose, buds globose, the		
apex rather acute	5.	C. chinense.
Tube of calyx short; buds not pointed:-		
Flowers squamose; leaves not cordate and with distinct		
petioles '3-'4 in. long :—		
Fruit not compressed, its faces all narrow and equal,		
	6.	C. squamosum.
Fruit compressed, two of its faces broad and two		1
	7.	C. Wrayi.
Flowers not squamose; leaves cordate and with very		-
short petioles (*05-15 in. long):-		
Leaves glabrous except the midrib:-		
Panicle and calyx with short thick glandular hairs	8.	C. Kunstleri.
Panicles cincreous-tomentose; flowers puberulous;		
fruit black when ripe and with narrow wings	9.	C. nigrescens.
Leaves, except when old, with long adpressed hairs		1
beneath; panicles sericeous-tomentose; fruit pale-		
	10.	C. Scortechinii.
		335

1. COMBRETUM TRIFOLIATUM, Vent. Choix t. 58. A powerful climber; young branches slender, terete, glabrous or puberulous; in the older branches the bark scaling off. Leaves coriaceous, opposite or alternate, oblong-lanceolate or oblong-oblanceolate, or narrowly elliptic. sub-acute, the base cuneate; both surfaces glabrous and shining; main nerves 5-7 pairs, spreading or ascending, distinct on the lower surface, hardly visible on the upper, reticulations indistinct; length 1.75-5.5 in., breadth 8-2 in., petiole 2-25 in. Spikes axillary, solitary or in pairs, or terminal and in panicles, puberulous. Flowers :15 in. in diam. at the mouth, densely crowded. Calyx-tube with a very short constriction above the ovary; the mouth wide, cupular, and with 5 broad triangular teeth, everywhere adpressed-pubescent externally. Petals lanceolate, slightly exceeding the calyx-lobes in length. Disc and bottom of the mouth of the calvx pubescent. Stamens exserted. Fruit 1:1-1:25 in. long and 5 in. in diam., with 5 very acute angles, glabrous, dark-brown when ripe. G. Don in Trans. Linn. Soc. XV, 439; Miq. Fl. Ind. Bat. I, pt. I, 610; Kurz For. Fl. Brit. Burma I, 461; Clarke in Hook. fil. Fl. Br. Ind. II, 454. C. lucidum, Blume Bijd. 641. C. undulatum and C. elegans, Wall. Cat. 3993, 4003. C. subalternans, Wall. Cat. 4008? Terminalia lancifolia, Griff. Notul. IV, 685. Embryogonia lucida, Blume Mus. Bot. II, t. 52. Cacoucia? trifoliata, DC. Prodr. II, 22. C. lucida, Hassk. in Flora 1844, p. 607.

TRANG; King's Collector; doubtless also occurring in other provinces. DISTRIB. British India, Java.

2. COMBRETUM TETRALOPHUM, Clarke in Hook. fil. Fl. Br. Ind. II. 454. A powerful climber; young branches slender, with minute brown rusty scales. Leaves opposite, thinly coriaceous, oblong-elliptic, shortly acuminate, the base cuneate; upper surface glabrous, shining, the lower with scattered brown glands when young and puberulous on the midrib and nerves; main nerves 7 or 8 pairs, oblique, ascending, inconspicuous on both surfaces; length 2.5-5.5 in., breadth 1-2 in., petiole 3-4 in. Spikes axillary, solitary, much shorter than the leaves, slightly scaly below the flowers, very scaly and puberulous between them. Flowers ·1 in. in diam. at the mouth. Calyx-tube constricted above the ovary. the constricted part as long as the ovary; the mouth campanulate and with 4 ovate erect pubescent lobes. Petals slightly longer than the calyx-lobes but much narrower, linear. Disc and fundus of the mouth of the calyx rusty-villous. Stamens and style exserted. Fruit '75-1 in. long and half as broad, shining, dark-coloured, the edges very acute but not winged.

MALACCA; Griffith 2195. PERAK; King's Collector 1012. DISTRIB. Siam, Borueo.

3. Combretum sundiacum, Mig. Fl. Ind. Bat. Suppl. 327. A verv powerful climber; young branches closely covered with deciduous scales. Leaves opposite, thinly coriaceous, broadly elliptic to ellipticorbicular, abruptly and very shortly acuminate; the base rounded, rarely slightly caneate, sometimes unequal-sided; both surfaces glabrous, the upper punctate and with very sparse scales; the lower with the scales more numerous and white with dark centres; main nerves about 6 pairs, oblique, curving slightly, not prominent on the upper surface but slightly so on the lower when dry; length 2.75-4 in., breadth 1.8-2.75 in., petiole 4-8 in. Panicles axillary and terminal, umbellate, longer than the leaves, the branches ending in dense globose minutely bracteolate spikes. Calyx-tube about 35 in, long, minutely pubescent, not scaly, 4-ridged along the ovary, above it cylindric, expanding upwards into a funnel-shaped mouth with 4 narrowly triangular-acuminate reflexed lobes; calvx inside with a ring of hairs at its base but not filled with long coarse hair, narrowly ovate and very acute in bud, Petals much shorter than the calvx-lobes, oval, not clawed, glabrous. Stamens exserted. Fruit about 1 in. long and nearly as broad, with 4 coriaceous horizontally-striate shining wings, and with a few minute scattered scales. Clarke in Hook, fil. Fl. Br. Ind. I. 458.

MALACCA; Maingay 648. SINGAPORE; Hullett 89; Ridley 4668. Perak; Scortechini 1016. King's Collector 4360, 4452, 5864, 7827; Wray 4272.

Readily recognised by its panicled inflorescence, the branches being umbellate and each ending in a globose spike of flowers with very acute buds which are not scaly.

4. Combretum extensum, Roxb. Hort. Beng. 28; Fl. Ind. II. 229. A large climber; young shoots rather slender, sometimes angled, very sparsely lenticellate. Leaves opposite or nearly so, coriaceous, broadly elliptic to sub-rotund, rarely ovate, the apex shortly and abruptly acuminate or sub-acute; the base broad and rounded, rarely slightly cuneate; both surfaces glabrous; the lower reticulate, punctate and slightly rough; main nerves 6 or 7 pairs, spreading, interarching a little way from the edge; length 4.5-7 in., breadth 2.75-4 in., petiole ·6-1·5 in., stout. Spikes axillary and solitary, or sometimes in fewbranched panicles, rarely terminal, often as long as or longer than the leaves, puberulous. Flowers 25 in. wide at the mouth when expanded: the buds ovate, very acute at the apices. Calyx-tube very long, (35 in.) infundibuliform, puberulous; the mouth 15 in. long, deeply cut into 4 triangular acuminate reflexed lobes. Petals ovate-truncate or oboyate. shorter than the calyx-lobes; calyx with a ring of hairs at the throat inside, otherwise nearly glabrous. Fruit when fully ripe about 1.25-1.5 in. long, and (including the wings) nearly as broad, wings scariose.

glabrous or glandular-puberulous. Wall. Cat. 3996; G. Don in Trans. Linn. Soc. XV, 422; Miq. Fl. Ind. Bat. I, pt. I, 608; Kurz For. Fl. Brit. Burma I, 463; Clarke in Hook. fil. Fl. Br. Ind. 11, 458. C. rotundifolium, Roxb. Fl. Ind. II, 226; Wall. Cat. 3995. C. Wightianum, Wall. Cat. 4007; W. & A. Prodr. 317; Wight Ic. t. 227; Dalz. & Gibs. Bomb. Fl. 90. C. Horsfieldii, Miq. l. c. 609; Kurz in Flora 1871, p. 289. C. platyphyilum, Heurck & Muell.-Arg. Obs. Bot. 242; Kurz in Journ. As. Soc. Beng. 1874, pt. II, 188. C macrostachyum, Wall. Cat. 3997. C. latifolium, Blume Bijd. 641; Miq. l. c. 609. C. leucanthum, Heurck & Muell.-Arg. Obs. Bot. 240. C. formosum, Griff. Notul. IV, 682, (fide Kurz).

MALACCA; Derry 386. Andaman Islands; very common. Not common in the other Provinces. Distrib. British India.

COMBRETUM CHINENSE, Roxb. Hort. Beng. 28. A powerful climber; young branches slender, terete, with sparse minute scales. Leaves opposite, or in whorls of three (VAR. ternatum), thinly coriaceous, elliptic or elliptic-oblong, sometimes obovate, shortly and abruptly acuminate, the base slightly narrowed; both surfaces glabrous, sparsely squamulose like the young branches and inflorescence, the upper surface of a dark colour when dry, the lower pale-brown (pubescent in VAR. pubescens); main nerves 7 or 8 pairs, spreading, curved, slightly prominent on the lower surface, scarcely visible on the upper; length 3.25-5 in., breadth 1.5-2.25 in., petiole 15-4 in. Spikes solitary, axillary, longer than the leaves, many-flowered; the bracteoles linear, deciduous. Calyx-tube 25 in long, slender at the base, expanding into a funnelshaped mouth 15 in in diam. when fully expanded, with 4 deep erect triangular acute scaly lobes, globular when in bud but the apex acute. Petats broadly obovate, clawed, longer than the lobes of the calyx, glabrous. Disc and interior of calyx fulvous-pubescent. Fruit 1-1:25 in. long and 8-1 in. broad, with 4 slightly unequal scarious coriaceous horizontal striate sparsely squamulose wings. Roxb. Fl. Ind. II, 230 (not of G. Don); Kurz For. Flora Burma, I, 463; Clarke in Hook. fil. Fl. Br. Ind. II, 457. ? C. Griffithii, Heurck and Muell.-Arg. Obs. Bot. 231.

Andaman Islands; very common. Perak; Wray 2314, 2743. King's Collector 4646.

Var. ternatum; Clarke in Hook. fil. Fl. Br. Ind. II, 453; leaves often in whorls of three, usually obovate. C. ternatum, Wall. Cat. 4002.

In the Andamans (doubtful). DISTRIB. Chittagong. Burma.

VAR. Porterianum, Clarke in Hook. fil. Fl. Br. Ind. II, 457; leaves elliptic-oblong, acuminate, never obovate, main nerves about 8 pairs. C. Porterianum, Wall. Cat. 4000.

PENANG.

This variety does not appear to have been collected since Wallich's time. I much doubt whether it is worth keeping up even as a variety.

VAR. pubescens, King. Leaves pubescent in the under surface. Perak; King's Collector 889.

6. Combretum squamosum, Roxb. Fl. Ind. III, 231. A large creeper; young branches slender, cylindric, covered (like almost all other parts of the plant) with scales with broad pale margins. Leaves opposite, thinly coriaceous, broadly elliptic or elliptic-rotund, rarely ovate-lanceolate, shortly and abruptly acuminate; the base rounded, rarely sub-cuneate; both surfaces dull when dry and scaly, but without hairs; length 3.25-5.5 in., breadth 2.25-4.5 in.; petiole 3-4 in., scaly. Spikes axillary or terminal, solitary or in panicles, shorter than the leaves, few-branched. Flowers 15 in. in diam. at the mouth. Calyx-tube shortly constricted above the 4-angled ovary; the mouth cupular, with 4 broadly triangular teeth. Petals small, obovate. Disc and fundus of month of calvx fulvous-villose. Fruit .75-1.5 in. long and nearly as broad (including the wings), with 4 wide thin membranous wings, squamose at the bottom of the deep grooves between the wings. Wall. Cat. 3987; Mig. Fl. Ind. Bat. I, pt. I, 607; G. Don in Trans. Linn. Soc. XV, 438 (inaccurate as to the floral symmetry); W. & A. Prodr. 317; Kurz For. Fl. Brit. Burma I, 463; Clarke in Hook. fil. Fl. Br. Ind. II, 456. C. lepidotum, Presl Bemerk. 142 (see Kurz in Flora 1871, p. 289). C. Maluloeu, Wall. Cat. 3991.

MALACCA; Maingay 648. ANDAMAN ISLANDS. PERAK; King's Collector 5083. Penang; Wallich, King's Collector 1335, Curtis 258.

A species easily recognised by being everywhere covered with scales. Some of the Penang specimens have ovate-elliptic leaves; otherwise they do not differ from specimens from other places.

7. Compression Wrays, King n. spec. Young branches slender, striate when dry, glabrous but slightly scaly. Leaves opposite, coriaceous, narrowly elliptic, subacute or very shortly and bluntly acuminate, the base rounded; both surfaces reticulate, the upper glabrous and shining; the lower dull, glabrous elsewhere, but with some coarse hairs along the sides of the midrib near its base; main nerves 6 or 7 pairs, ascending, curved, slightly prominent beneath; length 2.5-3.5 in., breadth 1.15-1.5 in.; petiole 35-4 in., rather rough when dry, those in the upper part of the stem and in the axils of which the spikes arise much smaller. Spikes axillary, solitary, about 1 in. long, the peduncles glabrous, the floriferous part pubescent and scaly. Flowers few, in clusters of 2 or 3. Calyx-tube 15 in. long, shortly constricted above the ovary, the mouth campanulate and deeply cut into 4 triangular acute erect

teeth, every part densely covered with brown scales externally. *Petals* slightly exceeding the calyx-lobes, oblanceolate, obtuse, glabrous, erect. *Stamens* 8, exserted. *Fruit* compressed, ovate, pointed at each end, dark-brown when dry, with 4 short wings, about 1·2 in. long and 6 in. broad on the compressed surfaces, the other two surfaces narrow and grooved, all parts sparsely scaly.

PERAK; sea-shore at Matang, Wray 2504.

8. Combretum Kunstleri, King n. spec. A powerful climber; young shoots slender, terete, very slightly puberulous and with very few scattered rusty hairs intermixed. Leaves opposite, narrowly elliptic or elliptic-oblong, shortly and bluntly acuminate, slightly narrowed to the minutely cordate base; upper surface glabrous except the minutely pubescent midrib, shining; the lower dull, glabrous even on the midrib; main nerves 5-7 pairs, ascending, curving, length 3-5.5 in, breadth 1·1-1·85 in.; petiole ·1 in. or less, glabrous. Panicles axillary and shorter than the leaves or terminal and much longer, pedunculate, with many short thick glandular hairs, the branches rather short and spreading, bracteoles shorter than the ovaries. Calyx-tube about 1 in. long, constricted both below and above the ovary, the limb widely campanulate and with 4 very shallow broad reflexed teeth, clothed outside with glandular hairs. Petals inserted near the edge of the calyx-limb and projecting beyond its lobes, broadly ovoid, reflexed, pubescent. Fruit 4-winged, tapering to the ends (when young), unknown in the ripe state.

PERAK; King's Collector 3435, 6664; Scortechini 2014.

9. Combretum nigrescens, King n. spec. A slender climber 20-40 feet long; young branches rusty-puberulous and with sparse long rusty-silky hairs. Leaves opposite, membranous, black when dry, narrowly elliptic to oblong, shortly acuminate, the base rounded, the petioles very short; upper surface shining, glabrous except the rusty-sericeous midrib; lower surface with the midrib and main nerves rusty-sericeous, the intercostal spaces almost glabrous; length 2.25-2.75 in., breadth .75-1 in., petiole less than .1 in. Panicles terminal, lax, spreading, longer than the leaves, minutely cinereous-tomentose with a few long rusty hairs intermixed, the branches interruptedly spicate, bracteoles shorter than the calyx-tube. Calyx-tube only about \*05 in. long; the limb rather longer, campanulate and with 4 rather shallow broad acute teeth, puberulous on the outer surface, pubescent on the inner, with a wing of hairs in the throat. Petals about as long as the calyx-lobes, broadly ovate or slightly obovate, blunt, puberulous on the outer surface, sericeous on the inner. Stamens 8, unequal, the outer row the longest. Fruit black when dry, shining, glabrous, with 4 narrow wings, 8 in long and 4 in broad.

PERAK; King's Collector 3469, 8140.

10. COMBRETOM SCORTECHINH, King n. spec. Young branches slender, softly sericeous-tomentose. Leaves opposite, thinly coriaceous, oblong-elliptic or sometimes oblong-oblanceolate, the base rounded or very minutely cordate; upper surface shining, glabrous except the depressed rusty-sericeous midrib; lower surface reticulate, with many long adpressed hairs near the base and along the prominent midrib. the nerves and intercostal spaces with shorter scattered hairs, when old almost glabrous; main nerves about 7 pairs, ascending, curved, prominent on the lower surface, slightly depressed on the upper, length 3.25-4.5 in., breadth 1.4-1.75 in., petiole 1-15 in. Panicles axillary and terminal, shorter than the leaves; the branches few, short and fewflowered, everywhere softly sericeous-tomentose. Calyx-tube 1 in. long, cylindric; the mouth slightly longer, widely campanulate, with 4 shallow broad acute reflexed teeth, softly tomentose like the tube. Petals 4, inserted near the edge of the calyx and projecting beyond it, broadly ovate-lanceolate, reflexed, pubescent, Stamens 8, exserted. Fruit with 4 thin sub-coriaceous wings, pointed at each end, glabrous, 1.25 in. long, and .65 in. broad.

PERAK; Scortechini.

Collected only once, and the specimens are few.

# 5. Quisqualis, Linn.

Large shrubs scandent or subscandent. Leaves opposite, oblong or obovate, acuminate, entire. Flowers large, in short axillary or terminal spikes. Calyx-tube slender and much prolonged above the ovary, deciduous, its limb 5-lobed. Petals 5. Stamens 10, short. Ovary Leelled; style filiform, partially adherent to the calyx-tube, stigma sub-capitate; ovules 3 or 4, suspended from the apex of the loculus. Fruit dry, 5-angled or 5-winged, coriaccous, subindehiscent. Seed solitary, cotyledons plane. Distrib. Species 5, tropical Asian or African.

Calyx-tube less than 1 in. long ... ... 1. Q. densiflora. Calyx-tube from 1.5–2.5 in. long ... ... 2. Q. indica.

1. Quisqualis densificata, Wall. Cat. 4011. Young branches minutely rusty-puberulous. Leaves elliptic-oblong or oblanceolate-oblong, shortly acuminate, the base rounded or minutely cordate; upper surface glabrous except the pubescent midrib and main nerves; lower surface glabrous, the 6 pairs of curved ascending main nerves with tufts of hair in their axils; both surfaces shining and minutely papillose; length 3.5 to 4.5 in., breadth 1.5-2 in.; petiole 2-3 in., pubescent on the upper surface. Spikes axillary and solitary, or terminal and almost panicled, rusty-pubescent; bracteoles lanceolate, sub-persistent, rusty-

pubescent, 5-75 in. long. Calyx-tube produced beyond the ovary for 25-5 in., cylindric, rusty-tomentose; its mouth funnel-shaped and deeply divided into 5 narrow lanceolate-subulate lobes. Petals shorter than the calyx-lobes, oblong, obtuse, about 2 in. long, scarlet, rusty-pubescent on the outer side, nearly glabrous on the inner. Fruit oblong, shining, with 5 rather narrow unequal thin coriaceous wings, 1 in. long and 65 in. broad.

PENANG; Wallich. PERAK; Wray 3353.

2. Quisqualis indica, Linn. Sp. Pl. 556. Young branches deciduously rusty-pubescent. Leaves elliptic, shortly acuminate, the base rounded: both surfaces more or less rusty-pubescent, nearly glabrous when adult except the midrib and nerves, always minutely papillose; main nerves 6-8 pairs, ascending, little curved, length 3-4 in., breadth 1.5-2 in., petiole about '3 in. Spikes axillary, their rachises shorter than the leaves, many-flowered, very unequal, rusty-tomentose; bracts lanceolate, sub-persistent, 35 in. long, pubescent. Calyx-tube produced beyond the overy for 1.5-2.5 in., its mouth short, funnel-shaped and divided into 5 broad triangular acute lobes. Petals oblong or oblongrotund, obtuse, 5 in. or more in length, red, puberulous. Fruit narrowly ellipsoid, tapering much to the apex, less so to the base, sharply 5angled, almost 5-winged, glabrous and of a deep brown colour, '75-1'25 in. long and from 3-45 in. broad. Lour. Fl. Cochinch. 336; Lamk. Ill. t. 357; DC. Prodr. III, 23; Roxb. Fl. Ind. II, 427; Wall. Cat. 4010; Wight Ill. t. 92; W. & A. Prodr. 318; Miq. Fl. Ind. Bat. I, pt. I, 610; Brandis For. Fl. 220; Clarke in Hook. fil. Fl. Br. Ind. II. 459; Q. villosa, Roxb. Fl. Ind. II, 426; Spreng. Syst. II, 331; DC. Prodr. III, 23. Q. glabra, Burm. Fl. Ind. t. 28. Q. pubesecens, Burm. Fl. Ind. t. 35. Q. ebracteata, Beauv. Fl. Owar. t. 35. Q. Loureiri, G. Don Gen. Syst. II, 667. Q. sinensis, Lindl. in Bot. Reg. N.S. Vol. XXX, t. 15. Q. longiflora, Presl Epimel. 216. Quisqualis sp., Griff. Notul. IV, 683. Rumph. Herb. Amboin. V, t. 38.

Malacca, and probably truly wild; in the other provinces often cultivated as a garden plant. DISTRIB. Burma.

# 6. ILLIGERA, Blume.

Scandent shrubs. Leaves alternate, petioled, with three entire petioluled leaflets. Flowers in elongate lax peduncled cymes; bracteoles 1-3 at the base of each flower. Calyx-tube shortly constricted above the ovary; limb of 5 valvate oblong deciduous lobes. Petals 5, valvate, oblong, alternate with and as long as the calyx-lobes. Stamens 5, epigynous, filament near the base carrying on each side a staminode; anthers dehiscing by lateral valves. Ovary 1-celled; style, 1, filiform,

ending in a dilated undulate sinuate stigma; ovule 1, pendulous from the apex of the cell. Fruit broadly 2-4-winged (2-winged in the known Indian species), the wings veined. Seed with plane-convex (not convoluted) cotyledons. Distrib. Species about 7, extending from Khasia to Singapore, Malaya and the Philippines; and one aberrant species in Angola having 5 leaflets.

Main nerves of leaves 2 or 3 pairs, oblique ... ... 1. T. appendiculata.

Main nerves of leaves 12-14 pairs, horizontal... ... 2. T. lucida.

1. ILLIGERA APPENDICULATA, Blume Bijdr. 1153; Nov. fam. exp. p. 14. A powerful climber 40-80 feet long; young branches slender, tawny-pubescent, soon becoming glabrous, striate when dry. Common petiole about 3 in. long, with an annular swelling at the base, glabrous or glabrescent. Leaflets thinly membranous, very variable in shape. often oblique, oblong, elliptic to sub-rotund, the apex shortly acuminate acute or sub-acute; the base cuncate or rounded, sometimes unequalsided; upper surface usually glabrous; the lower very minutely lepidote, glabrous or pubescent all over or only on the 2 or 3 pairs of oblique indistinct main nerves; length 3-5.5 in., breadth 1.75-4 in., petioles ·2-6 in. Panicles pendulous, very lax, 9-15 in. long, glabrous below but usually pubescent towards the extremities, the branches cymose. Flowers 2-35 in. in diam., on pubescent pedicels shorter than themselves. Calyx puberulous. Petals lanceolate, narrower than the lobes of the calyx, their midribs thick. Stamens curved inwards, longer than the staminodes when unfolded. Fruit narrowly oblong, tapering at the ends, 4-angled, minutely tomentose, 1-1.25 in. long, two of its margins produced into broadly oblong obtuse horizontally striate puberulous leathery wings 1.25 in. or more in width. DC. Prodr. XV. pt. I, 251; Kurz For, Flora Burma, I, 469. I. Coryzadenia, Meissn. DC. Prodr. XV, Pt. I, 251; Clarke in Hook, fil. Fl. Br. Ind. II, 460; Coryzadenia trifoliata, Griff. Notulæ, IV, 356.

Common in Perak and the Andaman Islands, and probably to be found in all the other Provinces. Distrib. British India, in Burma and Assam.

Variable in the shape and pubescence of the leaflets, the under surfaces of some being rather densely pubescent, while others are almost quite glabrous. For a form of the latter sort, the under surfaces of which are moreover somewhat glaucous, Kurz suggested the varietal name *pubescens*. Individual plants vary also as to the size of their flowers. The following, which I treat as a variety, was made a species by Clarke in Hooker's Flora of British India.

VAR. Kurzii, leaves glabrous, not lepidote, very coriaceous, the margin recurved and thickened. I. Kurzii, Clarke l. c.

Malacca; Maingay 650, 649.

2. ILLIGERA LUCIDA, Teysm. & Binn. Nat. Tijds. Ned. Ind. XXVII. 29. A slender climber; young shoots puberulous, angled when dry. Common petiole '75-2 in. long, glabrous. Leaflets membranous. oblong or elliptic-oblong, often oblique, the apex shortly and bluntly acuminate; the base rounded and usually minutely cordate; both surfaces glabrous and shining; the lower reticulate; main nerves 12-14 pairs, horizontal, interarching far from the edge, slightly prominent on the lower surface, obsolete on the upper; length 3-5 in., breadth 1.25-2.25 in., petiole .15-3 in. Panicles axillary and terminal, very lax; the ultimate branches sparse, few-flowered. Flowers 3 in. in diam. on thin puberulous pedicels. Calyx-lobes oblong, sub-acute, glabrous except for a patch of white hairs at the base in front. Petals about as long as the calyx-lobes but much narrower, villous at the base. Stamens shorter than the petals, the anthers large, the filaments villous in the lower half. Fruit (fide T. & B.) 4-winged, two of the wings larger than the other two, glabrous, about 1 in. long. Mig. Fl. Ind. Bat. Vol. I, pt. I, 1094.

PERAK; Scortechini 1610, Curtis 3182. DISTRIB. Java.

This differs from *I. appendiculata*, Bl. in having narrower leaflets, with much shorter petioles and more numerous nerves which are quite horizontal. The leaves are moreover quite glabrous and shining. The Perak specimens from which the above description has been taken agree absolutely with type specimens of *I. lucida* received at the Calcutta Herbarium from the Buitenzorg Botanic Garden.

# 7. Gyrocarpus, Jacq.

A tall tree. Leaves alternate, long-petioled, large, entire or lobed, clustered towards the ends of the branches. Flowers small, unisexual, very numerous, clustered in large branched eymes without bracts. Male flowers very numerous; calyx 4-7-partite; petals 0; stamens 4-7, inserted at the base of the calyx with as many alternate clavate glands; anthers 2-celled, dehiscing by valves; ovary 0. Female or hermaphrodite flowers few; calyx-tube adherent to the ovary, limb 2-partite persistent, enlarging in fruit; petals and stamens 0; ovary 1-celled; style 0, stigma sessile; ovule solitary, pendulous from the apex of the cell. Nut bony, crowned by the elongate spathulate coriaceous calyx-lobes. Seed with convolute cotyledons. A single species.

Gyrocarpus americanus, Jacq. Select. Am. 282. t. 178. Young branches stout, glabrous. Leaves membranous, broadly rotund-ovate, acuminate, the base broad and sometimes sub-cordate; the base usually 5-nerved, the midrib with about 3 pairs of main nerves; length 4.5-6 in., breadth 4 or 5 in., petiole 3-5.5. Fruit sub-globular, about 1 in. in diam., minutely pubescent; the wing narrowly spathulate, 3 in. long. G. Jacquinii, Gaertn. Fruct. II. 92; Roxb. Hort. Beng. 11, Cor. Pl. t.

1; Fl. Ind. I, 445; Lamk. Ill. t. 850; Bedd. Fl. Sylv. t. 196; Kurz For. Fl. Brit. Burma I, 470; Clarke in Hook. fil. Fl. Br. Ind. II, 461. G. asiaticus, Willd. Sp. Pl. IV, 982; Wall. Cat. 968; Miq. Fl. Ind. Bat. I, pt. I, 978; DC. Prodr. XV, pt. I, 248. G. acuminatus, Meissn. in DC. Prodr. XV, pt. I, 248. G. sphenopterus and G. rugosus, R. Br. Prodr. 405.

On the Sea-Coast in all the provinces. DISTRIB. Fropics generally.

The anthers of this species are two-celled and dehisce by upward-opening valves. Those of the genus *Hernandia* are also 2-celled, but dehisce by valves which open laterally. In habit and form of leaves *Gyrocarpus* much resembles *Hernandia*; whereas it is quite an aberrant form amongst *Combretacew*, as is also *Illigera*.

# MATERIALS

FOR A

# FLORA OF THE MALAYAN PENINSULA.

BY

GEORGE KING, K. C. I. E., M. B., LL. D., F. R. S.,

SUPERINTENDENT OF THE ROYAL BOTANIC GARDEN, CALCUTTA.

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No. 10.

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On the Sea-Coast in all the provinces. DISTRIB. Tropics generally. The anthers of this species are two-celled and dehisce by upward-opening valves. Those of the genus Hernandia are also 2-celled, but dehisce by valves which open laterally. In habit and form of leaves Gyrocarpus much resembles Hernandia; whereas it is quite an aberrant form amongst Combretacew, as is also Illigera.

Materials for a Flora of the Malayan Peninsula.—By George King, K.C.I.E., M.B., LL.D., F.R.S., Superintendent of the Royal Botanic Garden, Calcutta.

### No. 10.

I had hoped in the present contribution to have completed, for these Materials, my account of the whole of the remaining Natural Orders of Calycifloræ. This hope has, however, been frustrated by sickness. I have decided therefore to offer now to the Society the account of the five Orders which I have been able to elaborate; trusting, at some time in the near future, to deal with the remaining Orders of the Class. Following the sequence adopted by Sir Joseph Hooker in his Flora of British India, those treated of in the present paper come to be numbered as below; Nos. 48 Lythracea, 49 Onagracea, 50 Samydacea, 52 Cucurbitacea, and 56 Araliaceae. And those which remain to be described would be Nos. 46 Myrtaceae, 47 Melastomaceae, 51 Passifloraceae, 53 Begoniaceae, 54 Ficoideae, 55 Umbelliferee, and 57 Cornaceae. After finishing the Calyciflorae, I hope, in collaboration with my friend and successor Dr. D. Prain, to describe the families which are embraced in the gamopetalous and apetalous groups.

### Order XLVIII. LYTHRACEÆ.

Trees, shrubs or herbs; branches often quadrangular. Leaves entire, opposite, sometimes alternate or whorled; stipules 0. Inflorescence various, often in cymes or panicles. Flowers hermaphrodite, regular,

rarely oblique, unisexual in Cyrpteronia. Calyx-tube free, persistent lobes 3-6, valvate, some accessory often added. Petals as many as the calyx-teeth, rarely 0, inserted near the mouth of the calyx-tube. Stamens definite or numerous, inserted on the calyx-tube. Ovary free in the bottom of the calyx-tube (rarely inferior), 2-6-celled, style long; stigma capitate, rarely 2-lobed; ovules numerous, placentas axile (rarely parietal). Fruit coriaceous or membranous, free or more or less adnate to the base of the calyx, 2-6-celled or (by absorption of the partitions) 1-celled, dehiscent or indehiscent. Seeds numerous, various in shape, angular, sometimes winged; albumen none; embryo straight, (cotyledons convolute in Sonneratia and Punica.) DISTRIB. Species about 275 in tropical regions and especially in those of the New World; a few in temperate zones.

Tribe I. Ammanniæ. Herbs, mostly sub-aquatic, with small or minute flowers; the calyx membranous ... ... 1. Ammannia. Tribe II. Lythreæ. Trees or shrubs with moderate or large-sized flowers (minute in *Crypteronia*), large often wrinkled petals, and coriaceous or herbaceous calyx. Stamens not more than 12.

Calyx 6-toothed; petals 6; stamens 12; capsule circumscissile, 1-celled; seeds cuneate-obovate, angled ... 2. Pemphis.
Calyx 4- or 5-toothed; petals 0; flowers numerous, minute, racemose, sub-unisexual; stamens 4 or 5; capsule 2-celled and 2-valved; seeds minute, narrowly winged on one side ... ... ... 3. CRIPTERONIA.

Stamens indefinite.

Seeds free, not imbedded in pulp.

Stamens in 2 or more rows; capsule 3-6-celled; seeds large, winged laterally ... ... 4. LAGERSTREMIA.

Stamens in a single row; capsule 4-8-celled; seeds minute, narrowly winged at the upper margin ... §

Seeds imbedded in pulp, angular; berry 10-15-celled ... 6. Sonneratia.

## 1. Ammannia, Linn.

Annual glabrous herbs growing in damp places; branches often quadrangular. Leaves opposite and alternate, sometimes whorled, entire; stipules 0. Flowers small, axillary, solitary and subsessile, or in small trichotomous cymes; bracteoles usually 2. Calyx campanulate or tubular-campanulate, 3-5-toothed, often with minute interposed teeth or folds. Petals 3-5 or 0, small, inserted between the calyx-teeth. Stamens 2-8, inserted on the calyx-tube. Ovary enclosed in the calyx-tube, 1-5-celled, the septa very thin and often absorbed; style filiform or short, stigma capitate; ovules numerous, placentas axile. Capsule membranous, globose or elongated-ellipsoid, enclosed in the calyx, 2-3-valved,

irregularly breaking up, or circumscissile. Seeds many, small, smooth, round on the back and with a raphe on the inner face, ellipsoid or nearly hemispheric; placenta ultimately free central by the absorption of the dissepiments covered by the seeds. DISTRIB. Species 30; in the tropical or warm temperate zones of the whole world.

Flowers sessile, calyx-tube elongate-campanulate, capsule ellipsoid, seeds narrowly oblong, falcate ... 1. A. peploides.
Flowers pedicelled, calyx-tube depressed-bemispheric, capsule depressed-globose, seeds sub-hemispheric... 2. A. baccifera.

1. Ammania peploides, Spreng. Syst. I, 444. Flowers in short axillary branches, sessile, solitary in the axils of reduced leaves; bracts in pairs, filiform, shorter than the tube of the calyx. Calyx-tube elongate-campanulate, almost smooth, its mouth with 4 acutely triangular teeth. Petals absent, or 4 and minute. Capsule 2-valved, ellipsoid; seeds narrowly oblong, sub-falcate, pink, angular, the hilum obscure. Leaves opposite, their midribs prominent; those of the flower-bearing branches linear-oblong, bearing a flower in the axil of each; those of the main stem elliptic or obovate, narrowed to the base and almost petiolate. Stems decumbent, often rooting, sometimes erect. Boiss. Flor. Orient. II, 742; Kurz in Journ. As. Soc. 1877, pt. II, 84; Clarke in Hook. fil. Flor. Br. Ind. II, 566. A. nana, Roxb. Flor. Ind. I, 427, (not of Wallich). A. repens, Rottl., DC. Prodr. III, 80. Ameletia indica, DC. in Mem. Soc. Hist. Nat. Genev. III, 11 (1825) 2, and 82, t. 3 f. A.; Prodr. III, 76; Wall. Cat. 2093; W. & A. Prodr. 303; Blume Mus. Bot. II, 135, t. 47; Dalz. & Gibs. Bomb. Flor. 96; Wight Ic. t. 257. A. elongata, Blume Mus. Bot. II, 135. A. acutidens, Miq. Flor. Ind. Bat. I, Pt. I, 617. A. polystachya, Wall. Cat. 2094. A. latifolia, Wall. Cat. 2096, (partly Peplis indica,) Willd. Sp. Pl. II, 244.

South Andaman; near the settlements of Port Blair and Port Mowat; doubtless introduced as a weed of cultivation. DISTRIB. India, China, Persia; in rice and other fields.

2. Ammannia Baccifera, Linn. Sp. Pl. 120. Flowers in very condensed axillary racemes or clusters shorter than the leaves; bracts filiform, shorter than the flower-pedicels. Calyx-tube widely campanulate, short, ridged; the teeth 4, broadly triangular, acute. Petals none or minute. Capsule depressed-globose, imperfectly circumscissile above the middle. Seeds sub-hemispheric, black, excavated on the plane face. Leaves opposite, rather distant, linear-oblong, sub-acute or obtuse, narrowed at the base, smaller upwards, 2-5 in. long. Stem erect, glabrous, 8-24 in. long. Blume Mus. Bot. Lugd. Bat. II, 133; Dalz. & Gibs. Bomb. Flor. 97; Kurz in Journ. As. Soc. 1877, Pt. II, 85; Clarke in Hook, fil. Flor. Br. Ind. II, 569. A. vesicatoria, Roxb. Hort. Beng. 11

Flor. Ind. I, 426; ed. Wall. I, 447; DC. Prodr. III, 78; W. & A. Prodr. 305; Wall. Cat. 2098, (partly). A. indica, Lamk. Ill. I, 311, No. 1555; DC. 1. c. 77; W. & A. Prodr. 305; Wall. Cat. 2099; Blume 1. c. t. 46. A. debilis, Ait. Hort. Kew, ed. 1, I, 163. A. vertroillata, Boiss. Flor. Orient. II, 743, (not of Link). Hapalocarpum vesicatorium and H. indicum, Miq. Flor. Ind. Bat. I, Pt. I, 618. Cryptotheca apetala, Blume Bijd. 1128; DC. 1. c. 76.

PERAK; King's Collector 303; Curtis 3195. S. Andaman, in similar situations with the last.

### 2. Pemphis, Forst.

A maritime shrub or tree, 25-35 ft. high. Leaves opposite, oblong to oblong-lanceolate, entire, very thick, fleshy. Flowers small, axillary, solitary, peduncles 2-bracteate at their base. Calyx-tube campanulate, 12-\omega-ribbed; teeth 6, short, with 6 shorter accessory teeth. Petals 6, inserted at the mouth of the calyx-tube and nearly as long, obovate, wrinkled, white or rose. Stamens 12, inserted in two series towards the middle of the calyx-tube. Ovary free at the bottom of the calyx-tube, 3-celled at the base; style long, stigma capitate; ovules many, ascending; placentas 3, sub-basal. Capsule coriaceous, obovoid or nearly globose, included in the calyx-tube or exserted nearly half its length, somewhat irregularly circumscissile, ultimately 1-celled. Seeds very many, long cuneate-obovoid, angular, smooth, standing out in all directions from the apparently free central placenta.

Pempis acidula, Forst. Gen. t. 34. Young parts more or less clothed with grey silky hairs, the young branches 4-angled. Leaves subsessile or very shortly petioled, sub-acute or obtuse, 5-1.5 in. long. Flowers white. Capsule 4 in. long and 2 in. in diam. DC. Prodr. III, 89; Wall. Cat. 2108; W. and A. Prodr. 307; Griff. Notul. IV, 510; Blume Mus. Bot. II, t. 43; Miq. Flor. Ind. Bat. I, pt. I, 619; Bedd. Flor. Sylv. Anal. Gen. t. XIV, fig. 5; Kurz For. Flor. I, 518. P. angustifolia, Roxb. Hort. Beng. 91; Flor. Ind. II, 465. P. setosa, Lour. Flor. Filip. ed. I, 410. Maclellandia Griffithiana, Wight Ic. t. 1996. Lythrum Pemphis, Linn. f. Suppl. 249; Lamk. III. II, 408, fig. 2. Melanium fruticosum, Spreng. Syst. II, 445.

On the beech in Singapore and probably in all the provinces. Andaman and Great Coco Islands; *Prain*. Distrib. Burma, Ceylon, S. of British India.

# 3. CRYPTERONIA, Blume.

Trees. Leaves opposite, petioled, entire, ovate or lanceolate. Racemes elongate, in branched panicles. Flowers minute, white or green, 348

with short linear bracts at the base of the pedicels, polygamo-dicecious. Calyx-tube short, sancer-shaped, or longer and subhemispheric; teeth 5 (rarely 4), valvate, persistent. Petals 0. Stamens as many as the calyx-teeth, inserted between them near the mouth of the calyx-tube. Ovary free, 2-celled, with numerous horizontal or ascending ovules attached to the axile placentas; style long, filiform; stigma capitate, obscurely 2-lobed. Capsule surrounded at the base by the calyx, globose, pubescent, crowned by the persistent style, 2-celled, dehiscing so as to divide the style, fruit-pedicel deflexed. Seeds many, elongate-ellipsoid, narrowly winged on one side. Distrib. Species 5, extending from the Khasia Hills to the Philippine Islands.

Leaves membranous, usually narrowed to the base, nerves
5 or 6 pairs, calyx less than 1 in. in diam. ... 1. C. paniculata.

Leaves coriaceous, rounded or cordate at the base, nerves
7 or 8 pairs, calyx more than 1 in. in diam. ... 2. C. Griffithii.

1. CRYPTERONIA PANICULATA, Blume Bijdr. 1151. A tree 20-40 feet high; young branches glabrous or sometimes puberulous. Leaves membranous, oblong to oblong-lanceolate or more or less broadly elliptic, bluntly acuminate or blunt, narrowed to the base, entire, glabrous on both surfaces or slightly pubescent on the lower; main nerves 5 or 6 pairs, rather faint, curved; length 3-6 in., breadth 1.25-2.5 in. Flowers on short pedicels, very numerous, in long cylindric pubescent or glabrous racemes longer than the leaves, the racemes often panicled. Calyx less than 'I in. in diam., its teeth triangular or triangular-lanceolate, acute. Stamens in the hermaphrodite flowers of the same length as the calvx-teeth, longer in the male flowers. Capsules globose-conic, puberulous or minutely velvety. Kurz in Journ. As. Soc. Beng. 187, Pt. II, 86; For. Flora Burma, I, 519. C. pubescens, Blume Mus. Bot. Lugd. Bat. II, 123; Clarke in Hook. fil. Flor. Br. Ind. II. 574; Griff. Notul. IV, 404; Ic. Pl. Asiat. t. 564, fig. II. C. qlabra, Blume Mus. Bot. II, 123; Clarke in Hook. fil. Flor. Br. Ind. II, 574. Henslovia pubescens, Wall. Cat. 4904; Pl. As. Rar. III, 14 t. 221; Mig. Flor. Ind. Bat. I, Pt. I, 716; Planch, in Hook. Lond. Journ. Bot. IV, 477, t. XVI. B. Henslovia Hookeri, Wall. Cat. 8566. H. affinis, Planch. Lond. Journ. Bot. IV, 477 (in part). H. leptostuchys, Planch. Lond. Journ. Bot. IV, 478. H. glabra, Wall. Cat. 4093; Pl. As. Rar. III, 14; Planch. in Hook. Lond. Journ. Bot. IV, 478; Miq. Flor. Ind. Bat. I. Pt. I, 716.

Penang; Porter. Malacca; Maingay (Kew Distrib. 650/2). Perak; King's Collector No. 5205. Andaman Islands; very common; King's Collector. Distrib. Burma, Chittagong, Khasia.

I can find nothing better to distinguish the species which have been named

C. glabra and C. pubescens from each other than the presence on the latter of a small amount of hair, neither can I find any tangible character to separate either from C. paniculata, Blume. To the latter species, as the oldest, I therefore reduce both.

2. CRYPTERONIA GRIFFITHII, Clarke in Hook. fil. Flor. Br. Ind. II, 574. A tree 40-60 feet high; young branches glabrous. Leaves coriaceous, broadly elliptic, acute, very slightly narrowed to the rounded or cordate base, entire, glabrous on both surfaces; main nerves 7 or 8 pairs, distinct on the lower surface, curved, ascending; length 4-8 in., breadth 2·25-3·5 in. Racemes much longer than the leaves, rusty-pubescent, sometimes panicled; flowers numerous but not crowded, shortly pedicellate. Calyx rather more than 'l in in diam., its teeth triangular. Stamens exserted. Capsule shorter than the calyx-teeth, velvety, less than 'l in. in diam., crowned by the long stout pubescent style. Hensloviæ sp. Griff. Notul. 406; Ic. Pl. Asiat t. 564, fig. 1.

Malacca; Griffith 2513. Maingay (Kew Distrib.) 651. Derry 1201. Penang; Curtis 1739. Perak; Scortechini 221. Wray 2589, 2638. King's Collector 3473, 4152, 8592.

### 4. LAGERSTREMIA, Linn.

Trees or shrubs. Leaves opposite, distichous (or the uppermost alternate), entire, oblong or ovate. Panicles axillary and terminal, the ultimate branchlets usually cymose, sometimes dense; peduncles 2-bracteate at their apex; pedicels 2-bracteolate. Flowers often large. Calyx-tube funnel-shaped, smooth, grooved, angular or sub-alate; lobes 5-sometimes 7-9, ovate, subacute, valvate. Petals 6, sometimes 7-9 (or 0), inserted at the summit of the calyx-tube, clawed, wrinkled; margin crisped, erose, or fimbriate. Stamens very many, inserted in several rows near the bottom of the calyx-tube; filaments long, exserted. Ovary sessile in the bottom of the calyx, 3-6-celled; style long, bent, stigma capitate; ovules numerous, ascending, placentas axile. Capsule more or less adnate to the calyx, ellipsoid, coriaceous, smooth, 3-6-celled, 3-6-valved. Seeds many (rarely few), elongate, flat, erect, winged from their summit. Distrib. Species 18, in South-east Asia extending to Australia.

Inflorescence and exterior of calyx stellately ferrugineoustomentose ... ... ... ... ... 1. L. floribunda.

Inflorescence and outside of calyx minutely cinereous or
whitish-velvety (the calyx sometimes rusty in L. FlosReginæ).

Leaves glaucous beneath; calyx 10-ribbed, the mouth
with only 5 teeth ... ... 2. L. hypoleuca.

350

Leaves not glaucous beneath.

Calyx 8- or 9-ribbed, the teeth as many as the ribs and alternate with them; flowers 1.5 in. in diam.; leaves 2-3.25 in. long ...

... 3. L. ovalifolia.

Calyx 12-14-ribbed; the teeth half as many as the ribs, the ribs opposite the teeth broader; flowers 2-3 in. in diam.; leaves 3.5-8 in. long

4. L. Flos-Reginæ.

1. LAGERSTREMIA FLORIBUNDA, Jack in Mal. Misc. I, 38. A tree 15-30 feet high. Leaves ovate-oblong or elliptic-oblong, sub-acute, the base rounded, sub-sessile; main nerves 8-12 pairs, sub-horizontal or curving upwards; both surfaces minutely reticulate when dry, the upper glabrous and shining, the lower with deciduous stellate pale brown pubescence, or glabrous; length 5-7 in., breadth 2-2.75 in. Panicle much longer than the leaves, terminal, erect; the branches long, racemoid, the ultimate branchlets cymose, ascending, everywhere (as also the calyces,) covered with more or less deciduous wooly rusty pubescence. Flowers 1.5 in. in diam., on short pedicels. Calyx turbinate in bud. boldly 12-ridged, each alternate ridge passing into one of the 6 triangular calyx-teeth and often forming a mucro at its apex. Petals sub-orbicular, with wavy edges, rose-coloured changing to whitish. Stamens unequal, the outer rows the longest. Capsule 5 in long, elliptic, minutely cinereous-tomentose, half enveloped in the calvx. style persistent. DC. Prodr. III, 93; Wall. Cat. 2115; Miq. Flor. Ind. Bat. I, pt. I, 623 (not Blume Mus. Bot. II, t. 41); Griff. Notal. IV, 509; Kurz For. Flor. I, 522; Clarke in Hook. fil. Flor. Br. Ind. II, 577.

KEDAH; Curtis 2602. PENANG; King. TRANG; King's Collector 1407. MALACCA; Maingay (Kew Distrib.) 653/2. DISTRIB. Burma, Siam, China.

2. Lagerstræma hypoleuca, Kurz in Journ. As. Soc. Beng. for 1872 Pt. II, p. 30. A tree 60-70 feet high; all parts except the inflorescence glabrous. Leaves thickly membranous, oblong-lanceolate to elliptic or oblong-elliptic, shortly acuminate, the base rounded; main nerves 8-12 pairs, spreading, not prominent; both surfaces rather distinctly reticulate when dry, the upper shining, the lower glaucous; length 5-8 in., breadth 2-3 in., petiole 3 in. long. Panicles minutely cinereous-velvety, longer than the leaves, terminal, few-branched, the branches with rather short cymose sub-horizontal branchlets. Flowers about 1.25 or 1.5 in. in diam., on jointed whitish unequal pedicels. Calyx turbinate in bud, minutely whitish-velvety, boldly 10-ribbed, the alternate ribs excurrent into the 5 triangular acute mucronate lobes of the mouth. Petals lilac, oblong, wavy, 5 in. long. Capsule woody, oblong, mucronate, about .65 in. long. For. Flor. Burm., I, 5.33; Clarke in Hook. fil. Flor. Br. Ind. II, 577.

Andaman Islands; Kurz, Prain, King's Collectors. Great Coco Island; Prain.

3. LAGERSTREMIA OVALIFOLIA, Teysm. et Binn. in Nat. Tijdsch. Ned. Ind. II. (1840) 306. A tree 50 or even 100 feet high. Leaves oblong, ovate or oblong-obovate, acute, slightly narrowed to the base; main nerves 4 or 5 pairs, curved, ascending, slightly prominent on the lower surface when dry; upper surface greenish with minute black dots when dry, glabrescent except sometimes the minutely pubescent nerves; the lower brown when dry, glabrescent; length 2-3:25 in., breadth 1.25-2 in., petiole .25 in. Panicle terminal, puberulous, 3-8 in. long, few-flowered; the branches few, sub-horizontal, cymose, puberulous below; the pedicels minutely velvety, cinereous. Flowers 1.5 in. in diam., on jointed velvety pedicels. Calyx turbinate, minutely cinereous-velvety, with 8 or 9 bold winged ridges not passing into the calyx-teeth. Calyx-teeth 8 or 9, acutely triangular, the edges thickened and reflexed. Petals (with claw) '75 in. long, orbicular, clawed, purple, their edges slightly undulate. Capsule elliptic-ovoid, blunt, minutely velvety, '75 in. long, and '6 in. in diam. Kriudk. Arch. III, 440; Pl. Nov. Hort. Bog. (ed. Vriese) 20. Blume Mus. Bot. Lugd. Bat. II, 127; Miq. Flor. Ind. Bat. I, Pt. I, 624; Koorders and Valeton, Bijdr. I, 193. L. celebica, Bl. 1. c. 127. L. hexaptera, Miq. Flor. Ind. Bat. I, Pt. I, 623; Clarke in Hook, fil. Flor. Br. Ind. II, 577.

Malacca; Maingay (Kew Distrib. 653). Perak; King's Collectors 8701, 10025 & 10532. Pahang; Ridley 2640.

I can find no character to separate *L. hexaptera*, Miq. from the older species of Teysmann and Binnindik. Miquel's name is moreover an unhappy one, as the calyx-teeth are usually 9 and not 6.

4. LAGERSTREMIA FLOS-REGINE, Retz (1789) Obs. V, 25. A tree 30-60 feet high, all parts except the inflorescence glabrous. Leaves oblong to elliptic-oblong, acute, narrowed (rarely obtuse) at the base, shortly petiolate; main nerves 10-13 pairs, curving upwards, slightly prominent beneath when dry; both surfaces minutely reticulate, glabrous, the upper shining, the lower dull and of a dark brown colour when dry, length 3.5-8 in., breadth 1.75-3 in., petiole .25-4 in. Panicle terminal, longer than the leaves, its ultimate branchlets cymose. Flowers from 2-3 in. in diam., on rather thick greyish unequal pedicels. Calyx turbinate, with 12-14 prominent stout ridges; those opposite the calyx-teeth broader, the mouth with 6-7 acute triangular spreading thick coriaceous teeth thickened at the edges. Petals sub-orbicular, clawed, corrugated and with undulate edges. Stamens all equal in length. Capsule oblong to sub-globose, minutely apiculate, .8-1.25 in, long, and .6-.75 in. in diam. Kurz in For. Flora Burm. I, 524; Clarke in

Hook. fil. Flor. Br. Ind. II, 577. L. Munchhausia, Lamk. Ency. III, 375; III. t. 473 fig. 2. L. Reginæ, Roxb. Pl. Gorom. I, 46, t. 65; Hort. Beng. 38; Hook. fil. Flor. Br. Ind. II, 505; Blume Bijdr. II27; DC. Prodr. III, 93; W. & A. Prodr. Flor. Penins. Ind. 308; Blume Mus. Bot. Lugd. Bat. II, 126; Miq. Flor. Ind. Bat. I, Pt. I, 623 and Suppl. 328. L. speciosa, Pers. (1807) Ench. II, 72 (not of DC.); Koehne in Engl. Bot. Jahrb. IV, 28; Koorders and Valeton, Bijdr. I, 190, (excl. from all where reduced the syn. L. macrocarpa, Wall.).

MALACCA, Singapore. PERAK. DISTRIB. Java, British India.

I have adopted Retz's name (published in 1789) for this plant, as it is pretty nearly certain what Retz's plant was. Koehne, Koorders and Valeton and others however adopt Persoon's name of L. speciosa on the ground that, although it dates from only 1807, it preserves the specific name of Linnæus (Munchhausenia speciosa 1770). But this procedure is rendered inadmissable when Linnæus's description of that plant is consulted, for he describes M. speciosa as a shrub, whereas this plant is a large tree; moreover the rest of his description would apply to various other species of Lagerstramia; the identity of M. speciosa, L. is thus quite uncertain. L. macrocarpa of Wall. Cat. 2114, is a tree of about the size of L. Flos-Regine and resembles it in most respects, but differs (1) in having leaves of larger size (5-12 in. long) more or less broadly elliptic, never oblong or elliptic-oblong, the apex often sub-acute and the base broad or narrowed into a petiole twice as long as that of L. Flos-Reginæ; (2) in the calyx being very slightly, if at all, furrowed and never ribbed, and (3) in having a larger more globose capsule (1-1:35 in. long and nearly as much in diam.). This tree has been in cultivation in the Bot. Garden, Calcutta, side by side with L. Flos-Regine for many years. It flowers earlier than the latter, has pink (not lilac) petals, and much larger capsules. In my opinion it is a good species and should not be merged in L. Flos-Reginæ. It is found only in Burma and Chittagong. Kurz, who was familiar with it in its wild state in Burma, considered it distinct and kept it as a species in his Forest Flora of British Burma.

# 5. DUABANGA, Ham.

Large glabrous trees with pendent quadrangular branches. Leaves opposite, distichous, large, short-petioled, elongated, acute, entire, cordate or rounded at the base. Panicles large, terminal, with opposite branches; flowers large. Calyx-tube wide, adnate to the base of the ovary; lobes 4-7, thick, valvate in the bud. Petals 4-7, clawed, obovate, crisped and undulate, white. Stumens very many, inserted on a perigynous ring. Ovary conical, 4-8-celled; style bent, long; stigma capitate, 4-8-lobed; ovules very many, ascending, placentas covering nearly the whole interior surface of the ovarian cells. Capsule sub-globose, surrounded at the base by the thick spreading calyx, coriaceous, perfectly or imperfectly 4-8-celled, 4-8-valved. Seeds very numerous, minute, ellipsoid, testa produced at both ends in two tails much exceeding the length of the nucleus. Distrib. Species 2; Eastern Himalaya, Assam and Malaya.

Duabanga sonneratioides, Ham. in Trans. Linn. Soc. XVII, 178. A tree 60-100 feet high. Leaves thinly coriaceous, oblong to ovate-oblong, 7-12 in. long and 2·5-4 in. broad, glabrons, glaucous beneath. Flowers 2-2·5 in. across, on thick-jointed pedicels tapering to the base; panicle short, few-flowered, drooping. Petals 4-7, about 1 in. long. Capsule ovoid-globose, 1-1·5 in. in diam. Hook. fil. Ill. Him. Pl. t. 11; Kurz For. Flor. Burm. I, 525; Clarke in Hook. fil. Flor. Br. Ind. II, 579. D. grandiflora, Walp. Rep. II, 114. Lagerstræmia grandiflora, Roxb. Hort. Beng. 38; Flor. Ind. II, 503; DC. Prodr. III, 93; Wall. Cat. 2111; Blume Mus. Bot. I, 109. Leptospartion grandiflorum, Griff. Ic. Pl. Asiat. t. 591.

Perak; Scortechini, King's Collector 5912. Andamans and Nicobars, King's Collectors. Distrib. Burma, Assam, Khasia, Eastern Himalaya.

### 6. Sonneratia, Linn. f.

Ever-green trees, growing near the sea, glabrous. Leaves opposite, petioled, coriaceous, entire. Flowers without bracts, large, three together at the summits of the branches, or axillary and solitary. Calyx thick, coriaceous; lobes 4-8, lanceolate, valvate. Petals 0, or as many as the calyx-lobes and linear-oblong. Stamens numerous, inserted in a circular band on the calyx-tube. Ovary nearly free, or adnate at the base to the calyx-tube, many-celled; style long, stigma capitate; ovules numerous, ascending, placentas axile. Berry subglobose, supported by the persistent calyx, 10-15-celled. Seeds very many, small, curved, angular, embedded in pulp; cotyledons convolute. Distrib. Species 4-5; on the tropical sea-shores of the Eastern hemisphere.

With petals ... ... ... ... 1. S. acida.

Without petals:—
Calyx in bud ovoid, obtuse ... ... ... ... ... 1. S. acida,
var. Grifithii.
Calyx in bud narrowly ellipsoid, tapering to both ends ... 2. S. alba.

1. Sonneratia acida, Linn. fil. Suppl. 252. A small tree 10-35 feet high, the branchlets jointed and 4-angled. Leaves oblong to oblong-obovate or obovate, tapering into a broad short petiole, blunt and sometimes retuse; length 2-3 in., breadth 1.35 to 2 in. in the obovate forms. Flower-buds solitary, ellipsoid, the calyx-tube not angled; the calyx when fully developed 1 in. long, its lobes 6-8, the lobes triangular, reflexed. Petals linear, slightly broader towards the apex than at the base. Style exserted, sometimes 3 in. long, stigma capitate. Capsule depressed-globose, sometimes as much as 2 in. in diam., the apex somewhat concave, the walls thick. Roxb. Hort. Beng. 38; Flor. Ind. II, 506; Roth Nov. Sp. 233; DC. Prodr. III, 231; Wall. Cat. 3641

W. & A. Prodr. 327; Wight Ic. t. 340; Griff. Notul. IV, 652; Blume Mus. Bot. I, 336; Miq. Flor. Ind. Bat. I, Pt. I, 496; Dalz. & Gibs. Bomb. Flor. 98; Brand. For. Flor. 242; Kurz For. Fl. Burm. I, 526; Clarke in Hook fil. Flor. Br. Ind. II, 580; Koorders and Valeton, Bijdr. I, 198. Rhizophora caseolaris, Linn. Sp. Pl. 635. Aubletia caseolaris, Gærtu. Fruct. I, 479, t. 78.

Penang; Curtis 1108. Peran; Scortechini, Wray 2494. Andamans; Kurz, Prain, King's Collectors. Distrib. the coasts of Burma, the Deltas of the British Indian Rivers and of those of the Malayau Islands.

VAR. Griffithii, Leaves obovate, petals none. S. Griffithii, Kurz Pegu Report, App. B. 54; For. Flora Burma, I, 526; Clarke in Flor. Br. Ind. II, 580. S. alba, Griff. (not of Smith) Notul. IV, 652. S. neglecta, Bl. Mus. Bot. Lugd. Bat. I, 338; Miq. Flor. Ind. Bat. I, Pt. I, 498.

PERAK: Scortechini 967. DISTRIB. Burma.

The fruit of this variety is unknown; but the scanty material, so far as it goes, appears to show that the plant is merely an apetalous form of S. acida with leaves more obovate than is usual in that species. I have therefore reduced it to a form of the latter. Blume described other three species of Sonneratia with petals, viz., S. obovata, S. evenia, and S. lanceolata separating them chiefly by characters taken from the shapes of the leaves. But in this genus the form of the leaf is very variable, and I doubt whether these three species are more than forms of S. acida. S. Pagapat, Blanco, and S. ovalis, Korth. are probably also forms of it.

2. Sonneratia alba, Smith in Rees Cyclop. XXXIII, No. 2. A small tree 10-15 feet high; young branches rather terete. Leaves obovate or obovate-reniform, decurrent on the short petiole, blunt or retuse, 2-4 in. long and nearly as broad, petiole '125-'25 in. Flower-buds narrowly ellipsoid, tapering to each end, very slightly ridged; the fully developed calyx sharply angled; its lobes 6-8, oblong-lanceolate, acute. Petals none. Flowers about the size of those of S. acida, usually 2 or 3 together. Capsule broadly obconic, ribbed, 1 in. or more in diam. at the apex. DC. Prodr. III, 231; Blume Mus. Bot. Lugd. Bat. I, 338; Miq. Flor. Ind. Bat. I, Pt. I, 497; Kurz For. Flora Burma I, 526; Clarke in Flor. Br. Ind. II, 580; Koorders and Valeton, Bijdr. I, 200. S. Mossambicensis, Klotsch in Peters Reis. Mossamb. Bot. t. 12. S. acida, Benth. (not of Linn. fil.) Flor. Austral. III, 301; Hiern in Oliv. Flor. Trop. Afric. II, 483; Wall. Cat. 3641 B.

SINGAPORE; Wallich. DISTRIB. Java, Moluccas.

## Order XLIX. ONAGRACEÆ.

Herbs, rarely undershrubs, sometimes aquatic. Leaves opposite or alternate, entire or toothed, undivided (in Trapa the submerged leaves pinnatipartite), exstipulate. Flowers hermaphrodite, mostly axillary and solitary, or spiked or racemed towards the ends of the branches,

sub-irregular. Calyx-tube wholly adnate to the ovary (half-adnate in Trapa), limb with 2-5 valvate lobes. Petals epigynous, alternate with the calyx-lobes, rarely 0. Stamens as many or twice as many as the petals, inserted with them. Ovary inferior (half-inferior in Trapa), 1-6-celled, most often 4-celled; style 1, cylindric or subulate, stigma capitate or nearly 2-lobed or 4-fid; ovules one or many in each cell, pendulous or half-ascending, placentas axile. Fruit various, dehiscent or indehiscent, membranous capsular or bony, 1- or several-celled, 1 or  $\infty$ -seeded. Seeds without albumen, or nearly so. Distrib. Species 300, spread throughout the world, most abundant in the North Temperate Zone.

Stamens twice as numerous as the calyx-lobes ...

Stamens equal in number to the calyx-lobes ...

... 1. JUSSIÆA.

... 2. Ludwigia.

## 1. Jussiea, Linn.

Herbaceous or suffruticose, sub-aquatic. Leaves simple, alternate, usually entire. Flowers white or yellow, solitary, axillary; pedicel usually bibracteate at the apex. Culyx-tube narrow, only slightly produced above the ovary; its teeth 4-6, acute, persistent. Petals 4-6, epigynous. Stamens also epigynous, twice as numerous as the petals. Ovary inferior, 4-5-celled; style simple, usually very short, the stigma 4-or 5-lobed; ovules numerous, axile, in several vertical rows at the inner angle of each cell. Capsule narrow, cylindric or angled, 4- or 5-celled, 8-10-ribbed, dehiscing septicidally. Seeds very numerous, without coma. Distrib. Species 30, tropical, chiefly American.

JUSSIEA SUFFRUTICOSA, Linu. Sp. Pl. 555. Erect, branching, 1-4 feet high. Leaves lanceolate, ovate-lanceolate or almost linear, acute or acuminate, narrowed to the base, villous, pubescent or sub-glabrous. 2-3 in. long, and 25-75 in. broad, sessile or very shortly petioled. Flowers 5-75 in. in diam., on very short pedicels, the bracts small or foliaceous. Petals wholly yellow. Capsule linear, cylindric, 1-2 in. long, membranous, not woody, 8-ribbed, deciduously villous or pubescent. Seeds sub-hemispheric; the testa with a prominent raphe, shining. brown, not corky. DC. Prodr. III, 58; Wall. Cat. 6334; Miq. Flor. Ind. Bat. I, Pt. I, 628; Kurz in Journ. As. Soc. 1877, Pt. II, 90; Clarke in Flor. Br. Ind. II, 587. J. exaltata, Roxb. Hort. Beng. 33; Flor. Ind. II, 401. J. villosa, Lamk. Dict. III, 331; DC. Prodr. III, 57; Wall. Cat. 6333; W. & A. Prodr. 336; Gibs. & Dalz. Bomb. Flor. 98. J. fruticosa, DC. 1. c. J. scabra, Willd.; DC. 1. c. J. Burmanni, and octophila, DC. 1. c. J. longipes, Griff. Notul. IV, 689. J. decumbers, Wall. Cat. 6322. J. angustifolia, Lamk. Dict. III, 331 and Ill. t. 280, fig. 3; DC. Prodr. III, 55; Miq. Flor. Ind. Bat. I, Pt. I, 627. Epilobium fruticosum, Lour. Flor. Cochin-china 226. Rheede Hort. Mal. II, t. 50.

SINGAPORE; PENANG; PERAK; ANDAMAN ISLANDS, and probably in all the other provinces; DISTRIB. British India, Ceylon.

A widely distributed plant to which many names have been given. It is readily distinguished from J. repens, Linn. (the only other species common to the tropics of both worlds) by its narrower leaves, membranous capsule and erect habit.

#### 2. LUDWIGIA, Linn.

Herbs. Leaves alternate, undivided, sub-entire. Flowers usually axillary, solitary, sessile or nearly so, peduncle 2-bracteate at its apex. Calyx-tube scarcely produced above the ovary, linear in the Indian species; teeth 3-5, acute, persistent. Petals 3-5 (or 0), epigynous, yellow. Stamens equal in number to the calyx-segments, epigynous. Ovary inferior, 4-5-celled; style simple, stigma capitate; ovules very many, attached in 2 or more vertical rows to the inner angle of each cell. Capsule linear or oblong (in the Indian species), 4-5-celled, opening by terminal pores or breaking up irregularly along the sides. Seeds numerous, obovoid, smooth, raphe obscure or prominent but not large, without coma. Distrib. Species 20, mostly in North America; extending from the cool temperate zone to the equator; chiefly inhabiting marshes.

Capsules inflated, seeds in several rows ... 1. L. parviflora. Capsules filiform, not inflated; seeds in a single row in each cell ... ... ... ... 2. L. prostrata.

1. Ludwigia parvirlora, Roxb. Hort. Beng. 11; Flor. Ind. I, 419. An erect glabrous herb 8-24 in. high. Leaves lanceolate, linear-lanceolate or linear-oblong, narrowed to each end, 1-3 in long, and 25-75 in. broad. Flowers on short pedicels, usually 4-fid. Petals small. Capsule inflated, obsoletely 4-angled, smooth, crowned for sometime by the persistent calyx-teeth, 35-5 in. long. Seeds in many rows in each cell. DC. Prodr. III, 59; Wight Ill. t. 101; W. & A. Prodr. 336; Dalz. & Gibs. Bomb. Flor. 99; Benth. Flor. Austral. III, 307; Boiss. Flor. Orient. II, 752; Kurz in Journ. As. Soc. 1877, Pt. II, 91; Clarke in Hook. fil. Flor. Br. Ind. II, 588. L. lythroides, Blume Bijd. 1134; DC. l. c. D. jussieoides, Wall. Cat. 6335 (not of Linn. and others).

PERAK; Scortechini 442; Wray 2720. DISTRIB. British India and Ceylon.

2. Ludwigia prostrata, Roxb. Hort. Beng. 11; Flor. Ind. I, 420. Stem prostrate, or decumbent at the base and then erect, 8-24 in long, glabrous. Leaves lanceolate or linear-lanceolate, acute or acuminate, tapering to the base, 2-4 in long and 35-75 in broad. Flowers sometimes more than one in an axil, sessile, 4-fid. Petals lanceolate, longer than the calyx. Capsule 4-angled, thin, filiform, not at all inflated,

smooth, crowned by the linear calyx-teeth; length '5-1 in. diam. '02 in. Seeds oval, in a single row in each cell. DC. Prodr. III, 59; Wight Ic. t. 762; Kurz in Journ. As. Soc. 1877, Pt. II, 91. Clarke in Flor. Br. Ind. II, 588. L. diffusa, Ham. in Trans. Linn. Soc. XIV, 301; Wall. Cat. 6336; DC. l. c. L. fruticulosa, Blume Bijd. 1133; DC. l. c. Nematopyxis prostrata, pusilla, and fruticulosa, Miq. Flor. Ind. Bat. I, Pt. I, 630.

PERAK; Curtis 3183. SINGAPORE; King's Collector 58. ANDAMANS; King's Collector. DISTRIB. Burma, Cachar, Sylhet, Assam, and the base

of the Eastern Himalaya.

A species closely resembling *L. parviflora*, but readily distinguished by having very slender capsules, through the walls of which the seeds may be distinguished lying in single row in each cell; whereas in *L. parviflora* the seeds are in several rows in each cell and are undistinguishable on the outside of the thick walls of the short inflated capsules.

## Order L. SAMYDACEÆ.

Trees or shrubs. Leaves alternate, often distichous, petioled, rarely subsessile, simple, entire or slightly crenate or serrate, often closely punctulate beneath; stipules small, deciduous. Flowers regular, small, axillary, shortly pedicelled, densely fascicled or in long simple or panicled racemes. Calyx coriaceous, persistent; tube short, free, or longer and adnate to the ovary; limb 3-7-fid. Petals as many as the calyx-lobes (or 0), perigynous, imbricated. Stamens definite or indefinite, often with staminodes between or united in a tube with them. Ovary superior or half-superior, 1-celled; style 1, capitate or 3-fid at the apex, or styles 2-5; ovules many or several, placentas 2-5 (usually 3), parietal. Fruit loculicidally 2-5- (usually 3-) valved, valves carrying the seeds on their mesial line. Seeds several (usually few, sometimes many), oblong or angular, albuminous, usually drilled. DISTRIB. Species 180, scattered through the tropical regions of the globe, rarely also in the subtropical.

Flowers without petals :-

Flowers in axillary glomeruli, rarely solitary ... ... 1. CASEARIA.

Flowers in long slender racemes or panicles ... ... 2. OSMELIA.

Flowers with petals; flowers in axillary or terminal racemes or panicles ... ... ... ... 3. HOMALIUM.

# 1. Casearia, Jacq.

Shrubs or small trees. Leaves alternate, distichous, petioled, undivided, entire or slightly serrate, often minutely punctate; stipules small, lateral, caducous. Flowers small, greenish-yellow, clustered in the axils (in the Indian species); pedicels short, jointed above their bases, surrounded by small scales. Calyx inferior, deeply 4-5-lobed;

lobes imbricate, obtuse, persistent. Petals 0. Stamens double the number of the calyx-lobes or thereabout, united in a tube with staminodes alternating with the free portion of the filaments; staminal tube hypogynous, sometimes very short so that the filaments are nearly or quite free. Ovary free, ovoid, 1-celled, style simple, stigma capitate or 3-fid; ovules many, parietal. Fruit succulent, globose or ovoid, ellipsoid (when dry somewhat 3-angular or 6-ribbed), 3-rarely 2-valved. Seeds many, angular or obovoid, with a fleshy usually coloured aril; embryo straight. DISTRIB. Species 140, in the warmer parts of the whole globe, most plentiful in America.

Leaves pubescent on the lower surface, glabrescent on the upper :-Leaves narrowed or rounded, but never cordate or truncate, at the base; glomeruli few-flowered ... 1. C. Lobbiana. Leaves cordate or truncate at the base; glomeruli manyflowered ... 2. C. grewiæfolia. Leaves glabrous on both surfaces :-Fruit not exceeding 1 in. in length and usually much shorter :--Leaves broadly elliptic, shortly acuminate, thinly membranous; calvx-teeth 4 ... C. albicans. Leaves elliptic-oblong, thinly coriaceous or membranous, main nerves 10-12 pairs; stamens 10 4. C. andamanica. Leaves elliptic-oblong to elliptic-lanceolate, main nerves 6-8 pairs; stamens 8 5. C. esculenta. Fruit large, fleshy, 1.5-2 in. long; leaves narrowly oblong; coriaceous. Flowers in glomeruli :-Leaves tapering slightly to base and apex; fruit C. Kunstleri. Leaves acute at the apex, sub-acute at the base; fruit not apiculate C. Clarkei. Flowers solitary or in fascicles of 2, axillary ... 8. C. macrocarpa.

1. Casearia Lobbiana, Turcz. in Bull. Soc. Nat. Mosc. (1858), XXXI, Pt. I, 463. A sleuder tree 15-20 feet high; young branches slender, densely tawny-pubescent. Leaves oblong or oblong-lanceolate, shortly acuminate, the base rounded or narrowed; upper surface glabrescent, the midrib and nerves pubescent; lower surface sparsely pubescent, densely so on the midrib and nerves; main nerves 8-10 pairs, curving upwards, length 2-5 in., breadth 75-2.25 in.; petioles 2-3 in., tomentose, slender. Flowers few together in the leaf-axils, on very short pedicels, glabrescent. Calyx-teeth triangular, acute, reflexed. Staminodes villous, rather shorter than the stamens. Fruit almost sessile and nearly globose, orange-yellow when ripe, 5 in. long and 4 in. in diam. Clarke in Hook. fil. Flor. Br. Ind. II, 594.

SINGAPORE; Lobb. PERAK; King's Collector 2377, 2631, 10731; Wray; 829, 2594 Scortechini (without number). DISTRIB. Tenasserim.

2. CASEARIA GREWIEFOLIA, Vent. Choix. 48. A small tree; young branches 4-angled, densely rusty-tomentose. Leaves oblong, acute, not at all or very little narrowed to the cordate sub-truncate base, the edges entire or minutely crenulate; upper surface shining, almost glabrous, the lower surface pellucid-punctate when fresh, tomentose on the midrib and 10-14 pairs of little-curved ascending main nerves, otherwise sparsely pubescent; length 4.25-6 in., breadth 1.25-2.35 in., petiole 2 in. Glomeruli many-flowered, chiefly from the axils of fallen leaves; the flower-pedicels slender, '25 in. long, minutely pubescent, articulated at the base. Flower-bud 15 in. long; sepals minutely adpressed-pubescent, adnate at the base to the short staminal column. Stamens 8, the glabrous filaments alternating with the 8 pubescent staminodes. Ovary pyramidal, hairy at its junction with the style. Fruit compressed-ellipsoid, nearly 1 in. long, glabrous, boldly ridged when dry. DC. Prodr. II, 51; Miq. Flor. Ind. Bat. I, Pt. I, 706; Clarke in Flor. Br. Ind. II, 594. C. variabilis, Blume Mus. Bot. Lugd. Bat. I, 252. C. subcuneata, Mig. Flor. Ind. Bat. I, Pt. I, 706. C. cinerea, Turcz. in Bull. Soc. Nat. Mosc. (1858), XXXI, Pt. I, 462.

MALACCA; Maingay (Kew Distrib.) 659, 661. PERAK; Scortechini; 2003. DISTRIB. Java, Bali, and other Islands of the Malay Archipelago.

3. CASEARIA ALBICANS, Wall. Cat. 7197. A shrub 3 or 4 feet high; young branches slender, very pale, almost white when dry, glabrous. Leaves thinly membranous, pale brown when dry and much pellucid-punctate, more or less broadly elliptic, shortly acuminate; the base rounded or very slightly narrowed, the edges entire, both surfaces glabrous and finely reticulate when dry; main nerves 8 or 9 pairs, curved, ascending; length 4-7.5 in., breadth 2.25-4 in., petiole .25 in. Glomeruli small, few-flowered, axillary; flower-buds obovoid, almost sessile, surrounded by numerons acute bracteoles. Calyx-teeth 4, broadly triangular, glabrous. Fruit broadly ovoid, compressed, acute, subglabrous, 1 in. long and .65 in. in its broad diameter. "Samydex," Wall. Cat. 7432.

PENANG; Wallich. PERAK; King's Collector 3634.

The above description is drawn up from the two sheets of Wall. Cat. above quoted and of King's Collector 3634. One of Wallich's specimens 9197 has fruit in a pocket detached from the twig, the others have no fruit. The plant here named C. albicans is not, however, that described under the same name by Mr. C. B. Clarke in the Flora of British India. Mr. Clarke's plant is 660 of Maingay's Herbarium, and is referred by me (along with 660/2) to C. macrocarpa, Clarke.

4. Casearia and and anica, new species. A tree 20-40 feet high; young branches pale brown, glabrous. Leaves oblong-elliptic, acute, 360

slightly narrowed and somewhat oblique at the very base; both surfaces glabrous, minutely reticulate when dry; main nerves 10-12 pairs, spreading, curving upwards, slightly prominent beneath; length 6-9 in., breadth 2.75-3.5 in., petiole '5-'75 in. Glomeruli axillary, large and many-flowered; buds sub-globular, glabrous; pedicels about '25 in. long glabrous, the bracteoles minute. Calyx-segments ovate, glabrous; staminal tube wide, nearly glabrous, adherent below to the sepals; filaments 10, as long as the tube and as the alternating villous staminodes. Ovary elongate-pyramidal, 3-angled, stigma capitate; fruit unknown.

ANDAMAN ISLANDS; King's Collectors.

5. Casearia esculenta, Roxb. Flor. Ind. II, 422. A shrub or small tree as high as 20 or 30 feet; young branches pale, striate when dry, glabrous. Leaves thinly coriaceous, elliptic-oblong to elliptic-lanceolate, acute at the apex and acute or obliquely rounded at the base, the edges entire; both surfaces reticulate; main nerves 6-8 pairs, spreading, not prominent; length 3-7 in., breadth 1.5-2.25 in., petiole 25 in. Glomeruli axillary, many-flowered; buds and pedicels glabrous, the latter 2-25 in. long; bracteoles very short, glabrous. Calyx-teeth 4, broadly ovate, concave. Stamens 8, alternating with the staminodes. Ripe fruit ellipsoid to globular-ovate, glabrous, dehiscing by 2 or 5 valves, length 75 in. or more. Clarke in Flor. Br. Ind. II, 592. C. levigata, Dalz. in Hook. Journ. Bot. IV, 107; Dalz. & Gibs. Bomb. Flor. 11. C. Championii and C. Zeylanica, Thwaites, Enum. Pl. Ceylon, 19. C. varians, Thwaites Enum. 19 (in part).

Singapore; Lobb, Griffith, Maingay (Kew Distrib.) 657. Perak; Ridley 5218; Scortechini 804; King's Collector 4699, 7001.

A widely distributed species presenting a considerable amount of variation. Perak specimens have larger leaves than those from British India; but they appear to have smaller fruits; for Roxburgh describes the fruit of the plant, as it grows in the Northern Circars, as being as large as a nutmeg.

6. Casearia Kunstleri, King n. spec. A tree 30-80 feet high; young branches pale, glabrous. Leaves coriaceous, narrowly oblong, tapering slightly to each end, the edges entire; both surfaces glabrous and minutely reticulate; the upper shining, the lower rather dull; main nerves 7 or 8 pairs, ascending and only slightly curved, prominent on the lower surface; length 5-7 in., breadth 1·5-2 in.; petiole ·25 in, stout. Glomeruli mostly in the axils of fallen leaves, many-flowered; pedicels stout, glabrous ·35-·45 in. long; buds ·15 in. long, blunt. Calyx 5-cleft, the segments broadly ovate, obtuse, concave, minutely pubescent. Stamens 10, broad, sub-acute, the filaments broad, pointed, their edges pubescent. Staminodes elliptic, their apices acute and

pubescent. Ovary broadly ovate, 5-celled; the stigma capitate-discoid, almost sessile. Fruit bright yellow, broadly ovoid or obovoid, apiculate, tapering also to the base, glabrous, 1.5-2 in. long and .75-1.35 in. diam., pulpy and smooth when ripe, boldly 3-angled when dry.

PERAK; Wray 3752; King's Collector 3694, 6936, 7118.

This resembles both C. macrocarpa and C. Clarkei in several respects, but it has larger and more numerous flowers, and the fruit is broader, in proportion to its length, than is the case in either of these species. The leaves are less shining and reticulate than those of C. macrocarpa, but they closely resemble those of C. Clarkei.

7. Casearia Clarkei, King. A tree; young branches thick, glabrous, striate. Leaves corraceous, narrowly oblong, acute at both base and apex, both surfaces glabrous, the upper shining; main nerves 5-7 pairs, slightly curved, ascending, prominent beneath; length 5-10 in., breadth 1.5-2.75 in., petiole 25-4 in. long. Glomeruli very condensed, axillary, many-flowered; pedicels 25 in. long, glabrous like the buds. Ripe fruit ovoid, bright yellow, 2 in. long and 1.25 in. in diam. G. albicans, Clarke in Flor. Br. Ind. II, 593 (not of Wallich).

MALACCA; Maingay (Kew Distrib.) 660. SINGAPORE; Ridley 6334.

This species resembles C. macrocarpa Clarke, but has smaller fruit. Its leaves are moreover larger, less shining and less reticulate, and the glomeruli are much more numerously flowered.

8. CASEARIA MACROCARPA, Clarke in Hook. fil. Flor. Br. Ind. II, 593. A small tree; young branches reddish, glabrous. Leaves narrowly lanceolate, acute or acuminate, the base narrowed, the edges entire; both surfaces glabrous, shining, minute, reticulate when dry; main nerves about 5 or 6 pairs, curved, ascending, length 4-6 in., breadth 1 to 1.5 in., petiole 3-4 in. long. Glomeruli axillary, one-or few-flowered; pedicels about 15 in. long, glabrous, the buds glabrous outside, reddish; calyxteeth 5, oblong, blunt, minutely velvety inside. Fruit obovoid or ellipsoid, compressed, 1.5-1.75 in. long by 65 in. broad; seeds obovoid, compressed.

PENANG; Maingay 660/2; Curtis 229 and 960.

# 2. OSMELIA, Thwaites.

Trees. Leaves alternate, petioled, ovate or oblong-lanceolate, entire or obscurely serrate, epunctate; stipules minute, deciduous. Flowers small, very nearly sessile, in long simple or panicled racemes. Calyx inferior, divided nearly to the base; lobes 4 or 5, rounded, imbricate. Petals 0. Stumens 8 or 10, half alternating with as many 2-lobed hairy scales and half inserted in the notches of those scales. Ovary superior, 1-celled; styles 3, short, with capitellate or bifid stigmas; ovules few; 362

placentas 3, parietal. Capsule subglobose, 3-valved. Seeds few, subglobose, with a red fleshy aril. DISTRIB. Species 6; Malaya, Philippines, Ceylon.

OSMELIA MAINGAYI, King n. spec.. A diœceous tree 20-60 feet high; young branches slender, minutely tawny-tomentose. Leaves membranous, oblong or elliptic-oblong to elliptic, shortly acuminate, the base rounded or slightly narrowed, the edges entire or very obscurely crenate; the upper surface glabrous, the lower covered with minute vellowish pubescence especially on the nerves and midrib; main nerves 6-10 pairs, curved, spreading, interarching within the edge; length 4-6 in., breadth 1.75 to 3 in., petiole .6-.75 in. Male panicles slender, terminal, several times as long as the leaves; flowers 1 in. in diam. or less, on short pedicels bracteate at the base, in slightly distant small glomeruli. Sepals 4, membranous, imbricate, rotund, pubescent, concave. Petals 0. Stamens 8 in two rows, one row with longer filaments alternating with the row opposite the broad villous glands. Panicles of female flowers axillary, shorter than the leaves, slightly longer in fruit. Calyx as in the male, but the segments smaller. Stamens subequal, shorter than the calvx, the filaments very short, glands and ovary densely hairy; the latter sub-globular, tomentose, crowned by 3 short distant bifid glabrous stigmas, 1-celled; oyules 3, erect. Capsule ·5-·65 in. long, 3-ridged, dehiscing by 3 valves.

MALACCA; Maingay (Kew Distrib.) 1448. Perak; Scortechini 158, 191, 623. King's Collector 741, 1240, 2339, 4259, 4096, 5667, 7660, 7045, 10017, 10981; Wray 3665. Pahang; Ridley 2654. Singapore; King, Ridley 3804, 1904.

This appears to be a very common tree in Perak; for there is large suite of specimens of it in the Calcutta Herbarium numbering about 150 sheets. The various gatherings vary somewhat as to the amount of pubescence and number of nerves on the leaves, as also in the length of the panicles; but I cannot make out more than one species. Maingay's specimen (Kew Distrib.) 1439 looks as if it might be different. There is only a single sheet of it at Calcutta, and no flower remains on its panicles. Beccari's Sumatra plant 928 may possibly belong to still another species. All the species have the facies of Antidesma; the capsular fruit when present however at once distinguishes then from that genus.

# 3. Homalium, Jacq.

Shrubs or trees. Leaves alternate, crenate or subentire, petioled or sessile, rarely punctulate. Flowers hairy, small, in slender axillary and sub-terminal simple or panicled racemes; bract at the base of the pedicel often prominent but caducous. Calyx-tube funnel-shaped or cylindric, adnate to the base of the ovary; lobes 5-10, narrow, persistent. Petuls 5-10, inserted in the throat of the calyx, linear-oblong, persistent. Disc

tomentose. Stamens solitary or in fascicles of 2-7, opposite the petals, alternating with large glands. Ovary half-superior, 1-celled; styles 2-5, filiform, stigmas capitellate; ovules many or several; placentas parietal, extending only down the upper free portion of the ovary. Capsule half-superior, coriaceous, 2-5-valved at the apex. Seeds few, angular or oblong. Distrib.—Species 50, scattered over the hot regions of nearly the whole globe.

Flowers never more than 35 in. in diam .:-... 1. H. longifolium. Stamens 1 opposite each petal; leaves glabrous Stamens 2 in front of each petal; calyx-tube funnelshaped :--Leaves glabrous, glaucous beneath; flowers 6-2. H. Kunstleri. Leaves glabrous except on the midrib beneath, not H. propinguum. glaucous; flowers 6- or 7-merous ... Leaves sparsely pubescent on both surfaces, the 4. H. Griffithianum. midribs tomentose; flowers 10-merous Stamens 4 in front of each petal; flowers 6-merous, calyx-tube cylindric, expanding very slightly at the 5. H. frutescens. mouth Flowers '6-'75 in. in diam. :-Stamens 4 in front of each petal; calyx-teeth 5, much smaller than the petals Stamens 7-9 opposite or sub-opposite to each petal; calyx-teeth 7-9, larger than the petals and accrescent 7. H. grandiflorum.

1. Homalium longifolium, Benth. in Journ. Linn. Soc. IV, 35. A tree 30-60 feet high; young branches slender, lenticellate, almost glabrous. Leaves coriaceous, oblong or oblong-lanceolate, acute or shortly and bluntly acuminate, the base narrowed; the edges entire, sometimes slightly undulate; both surfaces quite glabrous, the lower darkest when dry; main nerves 7-9 pairs, spreading, curved, faint; length 3-4.5, in., breadth 1.5-1.75 in.; petiole 3 in., stout. Racemes slender, axillary, solitary, rarely branched, 4-7 in. long, covered with minute white tomentum. Flowers 15 in. across, almost sessile, in fascicles of 3 or 4, 6-fid. Calyx-tube narrow, its segments lanceolate like the petals but broader Stamens one opposite to each petal alternating with yellow-glands. Fruit unknown. Clarke in Flor. Br. Ind. II, 596. Blackwellia macrostachya, Turcz. in Bull. Soc. Imp. Mosc. 1863 (Vol. XXXVI), 610.

Penang; Phillips, Curtis 201. Malacca; Maingay (Kew Distrib.) 665; Derry 994. Perak; King's Collector 4444, 7855, 10230, 10763; Scortechini 487, 2036. Selangor; Scortechini 1910.

2. Homalium Kunstleri, n. spec. King. A tree 30-40 feet high; young branches glabrous, rather slender, smooth, glaucous. Leaves 364

coriaceous, oblong-elliptic, shortly acuminate, narrowed or rounded at the base, sometimes oblique; the edges remotely crenate, revolute when dry; both surfaces glabrous, the lower glaucous; main nerves 8 or 9 pairs, faint, curving upwards; length 4.5–7 in., breadth 2.25–2.75 in.; petiole 2–3 in., thick. Rucemes solitary, axillary, slightly longer than the leaves, bearing rather distant glomeruli of 3 or 4 flowers each, the rachis densely and minutely tomentose. Flowers 3 in. in diam., the pedicels about 1 in. long. Calyx-tube short, widely funnel-shaped; teeth 6, oblanceolate, obtuse, spreading, minutely tomentose externally. Petals 6, broadly lanceolate, sub-acute, equal in length to the calyx-teeth, villous on the inner surface. Stamens 2 in front of each petal; the filaments glabrous rising from a small bulb. Ovary hairy. Styles 5, short, sub-erect.

PERAK; King's Collector 4286, 7109.

3. Homalium propinquum, C. B. Clarke in Flor. Br. Ind. II, 597. A tree 60-80 or even 120 feet in height; young branches pale brown when dry, puberulous. Leaves coriaceous, elliptic to elliptic-obovate, obtuse, or shortly acuminate, more or less narrowed and sometimes slightly oblique at the base, the edges undulate- or undulate-crenate; both surfaces glabrous, the midrib alone sometimes puberulous beneath; main nerves 9-11 pairs, curved, spreading, prominent beneath when dry; length 4-7 in., breadth 2·25-3·5 in.; petiole 25-35 in. Racemes 4-12 in. long, clustered and sometimes panicled at the apices of the branches, covered with soft pale tomentum. Flowers 2 in. in diam., 6 or 7-fid, in close clusters and on pedicels 15 in. long. Calyx-tube funnel-shaped; its segments longer than the petals, subspathulate. Stamens twice as many as the petals, all bearing anthers. Fruit unknown. H. longifolium, (in part) Benth. in Journ. Linn. Soc. IV, 35. Blackwellia propinqua, Wall. Cat. 4898. B. spiralis, Wall. Cat. 4897A.

Penang; Porter, Curtis 1592. Perak; King's Collector 3748, 3935, 4883, 7936. Malacca; Griffith; Maingay (Kew Distrib.) 664.

4. Homalium Griffithianum, Kurz in Journ. As. Soc. Bengl. XL, Pt. II, (for 1877), 57. A tree 30-40 feet high, the young parts softly tawny-pubescent. Leaves membranous, obovate-oblong, shortly and bluntly apiculate, slightly narrowed to the rounded or minutely subcordate base, the edges subentire to coarsely crenate; both surfaces sparsely pubescent, tomentose or densely pubescent on the midrib and 7-9 pairs of spreading little curved not prominent main nerves; length 2.75-5 in., breadth 1.65-2.5 in.; petiole 2-4 in., pubescent. Racemes solitary, one and a half times as long as the leaves, softly tawny-tomentose; the glomeruli few-flowered, not crowded together. Flowers 35 in. in diam., densely villous in all parts. Calyx-tube conical

expanding into a wide mouth; the teeth 10, linear. Petals oblanceolate or spathulate, broader and longer than the sepals. Stamens 2 in front of each petal, glabrous. Ovary short, crowned by 5 short slightly spreading styles, glabrous towards the apex. Fruit unknown. Kurz For. Flora Burma, II, 531; Clarke in Flor. Br. Ind. II, 597. H. fætidum, Benth. in Journ. Linn. Soc. IV, 37 (in part). Blackwellia dasyantha, Turcz. Bull. Soc. Imp. Mosc. Vol. XXXVI (1863), 610. Blackwellia spec., Griff. Notulæ IV, 584.

KEDAH; Curtis 2506. TRANG; King's Collector 1393. DISTRIB.

Tenasserim.

Kurz describes the calyx-lobes and petals as 6 each, and in that he is quite wrong; for dissection of Griffith's specimen (which is the type of the species) shows 10 of each. Although the structure of the flowers is the same in the gatherings of this plant from Burma, Kedah and Trang, there is considerable difference as to the amount of hair on the leaves and also as to their edges. The Burmese specimens are rather obscurely crenate except when very young; the Kedah plant has its adult leaves boldly crenate and minutely pubescent on the lower surface and glabrescent on the upper (except the midrib and main nerves); while the Trang specimens are glabrescent on both surfaces, with the exception of the nerves and midrib. The flowers of the Trang plant are moreover slightly larger than those either from Kedah or Tenasserim.

5. Homalium frutescens, King. A tree 20-30 feet high; young branches slender, pale when dry, glabrous, striate. Leaves thinly coriaceous, elliptic-oblong to elliptic, shortly acuminate, tapering slightly to the base; main nerves 7 or 8 pairs, curving upwards, prominent beneath; both surfaces glabrous, minutely reticulate, the lower pale-brown and the upper olivaceous when dry; length 3-5 in., breadth 1.75-2.25 (rarely 2.75 in.), petiole 1 iu. Racemes axillary, sometimes with 2 or 3 branches, about as long as the leaves or sometimes longer, the rachis puberulous; the flowers numerous but not crowded, in pairs or solitary, about '25 in. long, and 'l in. or '15 diam. at the mouth; the pedicel under 'l in. in length. Calyx narrowly cylindric-conic, boldly ridged; teeth 6, lanceolate, acute, erect. Petals larger than the petals, oblonglanceolate, pubescent on both surfaces but especially on the upper. Stamens 4 opposite each petal and slightly exceeding it in length, glabrous. Overy hairy, elongate; styles 5, as long as the stamens, cylindric, erect, Fruit unknown. Blackwellia longiflora, Miq. Flor. Ind. Bat, I, Pt. I, 715. B. caryophyllacea, Zoll. et Moritz. Syst. Verz. 33; Miq. Flor. Ind. Bat. 1. c. 715; Homalium caryophyllaceum, Benth in Journ Linn. Soc. IV, 38. Cordylanthus frutescens, Blume Mus. Bot. Ludg. Bat. II, 27, fig. III. Homalium cordylanthus, Benth. in Journ. Linn. Soc. IV, 38.

Selangor; Ridley 1902. Johore; Ridley 4050, 4182. Perak; King's Collector, 776, 777, 784, 5246, 7040, 10471, 10237, 10102, 10996.

The flower of this is excellently figured by Blume in his Mus. Bet. as quoted above. Flowers however of a slightly different shape are found in some specimens. In these the calyx-tube is funnel-shaped and less cylindric, and the petals are more spreading. These are associated usually with larger leaves, more broadly elliptic in shape; and at one time I was of opinion that they might belong to a different species. But the examination of nearly a hundred specimens of the two forms as collected in Perak has convinced that they are not specifically separable. Blume describes the plant as a shrub, but in Perak it is always a small tree. Miquel's Homalium obovale from Sumatra (Flor. Ind. Bat. Suppl. 334) comes very near this, and perhaps is not distinct.

6. Homalium undulatum, n. spec. King. A tree 40-60 feet high; young branches slender, pale-brown, minutely lenticellate. Leaves thinly coriaceous, elliptic, shortly and bluntly acuminate, slightly narrowed and sometimes unequal at the base, the edges undulatecrenate; both surfaces glabrous and minutely reticulate when dry, the upper shining, the lower dull; length 3-4 in., breadth 1.75-2 in., petiole ·2-·25 in. Inflorescence consisting of a terminal panicle twice as long as the leaves and of a few solitary racemes from the upper leaf-axils, many-flowered, the rachises covered by minute rather sparse pale tomentum. Flowers 6 or 7 in. in diam., lax; their pedicels slender, tomentose, 4 in. long. Calyx-tube widely funnel-shaped, very slightly ridged, minutely tomentose; teeth 5, lanceolate, tomentose on both surfaces like the tube. Petals 5, much longer than the sepals, obovoid, blunt, clawed at the base, reticulate, tomentose. Stamens shorter than the sepals and much shorter than the petals, 4 in front of each petal, glabrous. Ovary hairy, crowned by 3 narrowly conical spreading hairy styles. Fruit unknown.

PERAK; King's Collector 7064, 8184.

7. Homalium grandiflorum, Benth. in Journ. Linn. Soc. IV, 37. A tree 30-40 feet high; young branches rather stout, glabrous. Leaves coriaceous, elliptic to oblong, acute or shortly acuminate, narrowed near the petiole, the edges revolute and obscurely crenulate; both surfaces minutely reticulate when dry, and the upper very shining, the lower somewhat duller; main nerves 9-12 pairs, ascending, only slightly curved; length 3.5-6.5 in., breadth 1.75-3.25 in.; petiole '2-3 in., stout. Inflorescence consisting of terminal few-branched panicles and of solitary axillary racemes with tomentose rachises. Flowers numerous but not crowded, solitary, not in glomeruli, '75 in. in diam.; the pedicels '2 in. long, tomentose. Calyx-tube short, hemispheric; teeth 7-9, spathulate-oblong, spreading, enlarged often flowering. Petals lanceolate, shorter than the calyx-teeth; the glands alternating with the petals, large. Stamens 7-12 opposite each petal; the filaments subulate, sparsely pilose. Ovary free or nearly so, 6-7-ridged, tomentose, conical; styles

6 or 7, short, glabrous, erect. Fruit unknown. Clarke in Flor. Br. Ind. II, 598. Pierrea dictyoneura, Hance in Trimen's Journ. Bot. for 1877, 339.

MALACCA; Griffith. PERAK; Scortechini. SINGAPORE; Ridley 6527. Gulf of Siam; Hance. DISTRIB. Tenasserim.

An examination of flowers of his *Pierrea dictyoneura*, sent to me by the late Dr. Hance, proves that that plant is a species of *Homalium* with larger flowers and more stamens than usual.

### Order LII. CUCURBITACE E.

Climbing herbs or shrubs; tendrils solitary, lateral, spiral, simple or divided. Leaves alternate, petioled, frequently cordate, simple, lobed or pedately divided. Flowers monœcious or diœcious, yellow or white, racemed and solitary, less commonly panicled. Calyx-tube wholly adnate to the ovary; limb rotate, campanulate, or tubular; lobes 5 (rarely 3), imbricate. Petals 5, inserted on the calyx-limb, united in a tube, or nearly or quite free, sometimes fimbriated at the margin, valvate or involute in the bud. Stamens inserted at the mouth or about the middle or at the base of the calyx-tube, usually 3 (sometimes 5 or 2), anthers free or united into a tube, one usually 1-celled and the other two 2-celled, cells straight or flexuose or conduplicate, the connective sometimes crested or produced. Ovary inferior, usually 3-carpellary; style 1 with 3 stigmas, more rarely styles 2-3-4; placentas usually 3, vertical, in double lines, the edges of the carpellary leaves being often turned in so far that the ovary (even before fertilization) is spuriously 3-celled; ovules usually many, horizontal, rarely pendulous, sometimes few and pendulous from near the top of the ovary. Fruit generally berried or fleshy, indehiscent or dehiscing by valves or by a circumscissile lid, often l-celled, the seeds being often packed in pulp or fibre. Seeds usually many, often compressed, horizontal, pendulous, frequently corrugated or sub-spinose on the margins, albumen 0. DISTRIB. Species 600, in the warmer parts of the whole globe especially in the tropics.

Tribe I. CUCUMERINEE. Ovules horizontal; female flowers solitary, never panicled; stamens 3, rarely 2 or 5, free or variously connate; cells of anthers straight, curved or flexuous; ovary bearing 3 (rarely 2 or 5) placentas:—

Anther-cells conduplicate or sigmoid; corolla rotate or

campanulate, divided to the base :-

Petals cirrhiferous or fimbriate :-

Seeds only 6, perfect, very large Seeds numerous, tests not fibrous 1. Hodgsonia.

2. TRICHOSANTHES.

Petals entire:

Calyx-tube of male flower elongate; the anthers included in the tube, cohering, sessile or subsessile, tendrils usually simple ... ...

3. GYMNOPETALUM.

Calyx-tube of male flower short; anthers usually exserted or sub-exserted, free or slightly coherent :-Stamens inserted near the mouth of the calyxtube; the anthers cohering slightly :-

Male flowers in racemes or clusters; fruit more or less fibrous, dehiscing by a transverse lid near the apex; tendrils 2-5-fid

Male and female flowers solitary; fruit not fibrous, very fleshy, indehiscent; tendrils 2-fid 5. Beningasa. Stamens inserted below the mouth of the calyxtube; anthers more or less cohering; male

flowers in racemes, usually bracteate; tendrils simple Anther-cells straight, the connective produced, the fruit

Tribe II. GYNOSTEMMEZ. Oyules pendulous; female flowers in panicles; stamens 3-5, anther-cells straight, filaments connate near the base; ovary 3-celled and with 3 placentas, fruit indehiscent

on a slender pedicel

Tribe III. ZANONEE. Ovules pendulous, female flowers in panicles or racemes; stamens 5, free, anthers straight; ovary with 3 placentas; fruit cylindric or clavate, dry, 1-celled, dehiscence circumscissile; seeds winged :-

Calyx-lobes 3, seeds winged all round Calyx-lobes 5, seeds winged at the apex only ... 4. LUFFA.

6. Momordica.

7. MELOTHRIA.

... 8. GINOSTENMA.

9. ZANONIA. ... 10. ALSOMITRA.

# 1. Hodgsonia, H. f. & T.

A large climber. Leaves coriaceous, 3-5-lobed, long-petioled; tendrils 2-3-fid. Flowers large, dicecious; males in long racemes; bracts oblong, entire, deciduous; females solitary. Male-calyx long-tubular, with a shortly campanulate mouth and 5 short teeth; petals 5, connate at the base, very long-fimbriate; stamens 3, filaments very short; anthers exserted, connate, linear, one 1-celled, two 2-celled, cells conduplicate. Female calyx and corolla as in the male; ovary globose, 1-celled; style long; stigmas 3, oblong, bifid, exserted; placentas 3, parietal, near the base of the ovary, 2-ovulate on each side. Fruit large, depressed-globular, 12-grooved, flesh hard; perfect seeds usually six, each having a smaller, commonly barren one, attached to its side, flat-ellipsoid, with sunk veins.

HODGSONIA HETEROCLITA, Hook. fil. and Thoms. in Proc. Linn. Soc. II, 257. Stem very long, often reaching 80 or 100 feet. Leaves palmate, somewhat cordate at the base; the lobes entire, rarely slightly denticulate, acute; both surfaces glabrous, minutely reticulate when dry, 6-10 in. long and as broad, the petioles 2 or 3 in. long. Male racemes about as long as the leaves; bracts solitary, oblong, acute, 5 in. long. Calyx rusty-tomentose externally, the tube 3 or 4 in. long, with a gland

on each tooth of the mouth. Petals sub-obcordate, retuse, about 2 in. long, covered with brown hairs and 3-nerved externally; the inner surface white, the margins fringed with very long spiral villous yellow threads. Filaments clavate, anthers forming an inverted cone; pistil 0. Female flowers often on a separate plant; their peduncles 1 or 2 in. long, occasionally in a raceme much shorter than those of the males; stamens 0. Fruit turbinate, 4-10 in. in diam., and less from base to apex, covered with short reddish-brown tomentum. Seeds 2-3 in. long, and 1.5-2.25 in. broad. Hook, fil. Ill. Himal. Pl. tt. 1, 2, 3; Flor. des Serres, t. 1262, 3; Clarke in Hook, fil. Flor. Br. Ind. II, 606. Hodgsonia macrocarpa, Cogn. in DC. Mon. Phan. III, 349. Trichosanthes macrocarpa, Bl. Bijdr. 935; Ser. in DC. Prodr. III, 315; Miq. Flor. Ind. Bat. I, Pt. II, 676. T. hexasperma, Bl. Bijdr. 935; DC. Prodr. III, 315; Hassk. Pl. Jav. Rar. 192; Miq. Fl. Ind. Bat. l. c. 678. T. heteroclita, Roxb. Hort. Beng. 70; Fl. Ind. III, 705; Wall. Cat. 6684. T. grandiflora, Wall. Cat. 6685 (not of Blume).

PERAK; Scortechini, Wray, King's Collector. MALACCA; Maingay. Penang; Wallich. Distrib. Sumatra, Java, Borneo, Burma, Assam, and the base of the Eastern Himalaya.

The earliest name of this species was Roxburgh's (T. heteroclita), published in the Hortus Bengalensis in 1814. Blume's name T. macrocurpa dates from 1826.

# 2. TRICHOSANTHES, Linn.

Scandent herbs. Leaves entire or 3-9-lobed, denticulate; tendrils usually 2-5-fid. Flowers directors or occasionally monrectors, white; male peduncles usually in axillary pairs, one 1-flowered caducous, the other racemose; bracts large or small or 0; female flower solitary. Malecalyx long-tubular; teeth 5, lanceolate, entire servate or laciniate. Corolla 5-fid nearly to the base, lobes long-fimbriate; stamens 3; anthers almost included, connate (free in T. dioica), long-linear, one 1-celled, two 2-celled, cells conduplicate. Female calyx and corolla as in the male. Ovary inferior, at the base of the calyx-tube, 1-celled; style filiform, 3-or 6-fid at the apex; placentas 3, parietal; ovules very many, horizontal, half-pendulous. Fruit lanceolate or globose, smooth, acute or obtuse at the apex. Seeds many, horizontal, packed in pulp, compressed, ellipsoid, sometimes angular on the margin. Distrib. Species 38, in South-East Asia, extending through Malaya to North Australia, also through China to Japan.

Leaves, although often deeply lobed, always simple:

Male inflorescence ebracteate ... ... 1. T. cucumerina.

Male inflorescence bracteate:

Bracts linear-oblong or narrowly rhomboid, quite
entire ... ... 2. ? T. Hearni.

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Bracts small ovate-lanceolate, caudate-acuminate, obscurely dentate, leaves quite smooth and glabrous on both surfaces

Bracts very large, ovate to sub-orbicular, deeply incised or simply serrate; calyx-teeth lanceolate; fruit usually globular, rarely ovate

Bracts rather large, oblong-ovate, laciniate; calyxteeth spreading, entire; fruit always ellipsoid ... 5. T. Wallichiana.

Leaves usually trifoliolate, but sometimes simple on the same or different plants; leaflets membranous, unequal, much acuminate, the edges undulate-dentate: bracts of male inflorescence small, oblong, their edges with a few long distant teeth ....

Leaves always trifoliolate; leaflets coriaceous, shortly and bluntly apiculate or subacute, the edges quite entire; bracts of male inflorescence deltoid, their edges pectinate 7. T. celebica.

3. T. tricuspidata.

4. \* T. palmata.

6. T. Waterai.

TRICHOSANTHES CUCUMERINA, Linn. Sp. Pl. Ed. 1, 1008. Stems slender, angled, puberulous. Leaves membranous, orbicular-reniform to broadly ovate in general outline; the edges remotely denticulate, often more or less deeply 3-5 or 7-lobed; the lobes broad with acute but not acuminate apices and often sinuate margins, the base deeply cordate, the sinus often sub-rectangular; upper surface sparsely pubescent or sub-glabrous, the lower deciduously pubescent at first, ultimately subscabrid; length 2-4 in. and breadth about the same; petiole 1-2 in., pubescent; tendrils slender, sulcate, puberulous, 2-3-fid. Male peduncles rather longer than the leaves, pubescent, bearing a few flowers towards the apex, ebracteate. Flowers :5-1 in. in diam. at the mouth; the tube 2 or 3 times longer, cylindric, a solitary male flower sometimes from the same axil as the peduncle. Female flower on a peduncle '5 in. long, fruit 1-3 in. long, narrowly ovoid, the apex conical, red when ripe; seeds half ellipsoid, compressed, corrugated. Lour. Flor. Cochchin, 588; Ser. in DC. Prodr. III, 315; Roxb. Hort. Beng. 70; Roxb. Flor. Ind. III, 720; Wall. Cat. 6690 A, B, C, D, F; Blume Bijd. 933; Dalz. & Gibs. Bomb. Flor. 102; Mig. Flor. Ind. Bat. I, Pt. I, 676; Naud. in Ann. Sc. Nat. Ser. 4, XVIII, 191; Kurz in Journ. As. Soc. 1877, Pt. II, 98; W. & A. Prodr. 350; Miq. Flor. Ind. Bat. I, Pt. I, 676; Thwaites Enum. Pl. Ceyl. 126; Benth. Flor. Austral. III, 314; Clarke in Hook. fil. Flor. Br. Ind. II, 609; Cogn. in DC. Mon. Phan. III, 358. T. laciniosa, Klein in Herb. Rottler. T. pilosa, Wall. Cat. 6691. Bryonia umbellata, Wall. Cat. 6700 D. Cucumis Missionis, Wall. Cat. 6728.

PERAK; King's Collector 5622. DISTRIB. Malayan Archipelago; British India.

The Perak plant has larger flowers than any Indian specimen, and I refer it to T. cucumerina with some hesitation.

2. ?TRICHOSANTHES HEARNI, F. Mull. in Benth. Flor. Austral. III, 315. Stem slender, glabrous, sulcate. Leaves membranous, broadly ovate, the apex acute or acuminate, the base deeply and widely cordate; the edges rather remotely denticulate, sometimes remotely sinuate-lobed; the upper surface glabrous and shining, the lower densely and minutely pubescent, the nerves, subglabrous and stout; length 4-8 in., breadth 3.5-6 in., petiole 1-1.75 in. Male peduncles often in pairs, axillary, longer than the leaves, slender, puberulous, angled; floriferous in the upper half; bracts linear-oblong, entire, about 25 in. long; several of the lower ones narrowly rhomboid, all pubescent, flowers under 1 in. in diam. at the mouth; calyx-tube cylindric, the mouth narrowly infundibuliform, puberulous; the lobes of the mouth narrow, acute. Female flower and fruit unknown.

ANDAMANS; Kurz, King's Collector.

The late Mr. Kurz collected a single specimen of this on Ratland island (in the Andaman group) many years ago, and he referred it in the Calcutta Herbarium to Arichosanthes reniformis, Miq. He also suggested for it the name Trichosanthes herpetospermum,—a name which he never published. In 1890 several specimens of the plant were collected near Port Mowat, on the South Andaman. Specimens of this second gathering, as well as of Kurz's original gathering, were sent by me to Mr. C. B. Clarke who found that they closely resemble, and are probably identical with, T. Hearni, an Australian species named by the late Baron von Müller, and of which an imperfect description was published by Mr. Bontham in his Flora of Australia. And to this species I now doubtfully refer both the Andaman gatherings.

TRICHOSANTHES TRICUSPIDATA, Lour, Flor. Cochinchin. II, 723. Stem stout, sulcate, smooth, glabrous. Leaves thinly coriaceous, ovatesub-triangular, with from 3-5 stout triangular broad, acute or acuminate, spreading lobes, the base broadly cordate, the edges remotely and minutely denticulate or subentire, glabrous on both surfaces; length and breadth 3-5 in.; petiole slender, 1-1.5 in.; tendrils 3-fid. Male peduncles floriferous for half their length, longer than the leaves, stout, glabrous or puberulous, 10-20 flowered; bracts thick, rigid, ovatelanceolate, caudate-acuminate, obscurely dentate or entire; calyx-tube tapering to the base, shortly but densely tomentose, the lobes caudatelanceolate with a few irregular distant teeth; corolla 15 in. in diam. Female flower from the same axil as the male peduncle, the tube 1.5 in. long, the corolla '75 in. in diam.; fruit ovoid when young, subglobular and 2 in. in diam. when ripe, smooth, yellow with numerous small black pustules, the pulp thick; the seeds in the very centre, broadly ovate, compressed, 5 in. long and 4 in. broad. Blume Bijdr. 935; Ser. in DC. Prodr. III, 315; Roem. Syn., fasc. II, 95; Miq. Flor. Ind. Bat. I, Pt. I, 676; Cogniaux in DC. Mon. Phan. III, 374.

PENANG; Curtis 1947. PERAK; Scortechini 376; King's Collector 2202. 5111; Wray 4029.

This resembles T. palmata, Roxb. and T. Wallichiana, Wight; but the lobes of the leaves are shallower and their surfaces more glabrous and not at all scabrid, while the bracts of the male inflorescence are much narrower and very acuminate; and their edges, instead of being laciniate, are entire or at most obscurely dentate.

4. TRICHOSANTHES PALMATA, Roxb. Hort. Beng. (1814) p. 70. Stem stout, angled and sulcate, glabrous. Leaves thickly membranous, broadly ovate or orbicular in general outline, deeply cut down to about the middle into 3-7 lobes; the lobes acute or acuminate, their edges entire or denticulate, the base deeply but usually narrowly cordate; upper surface more or less scabrous or scabrid, glabrous, glandular near the apex of the petiole, the lower glabrous or somewhat pubescent, length and breadth 2-6 in.; petiole rather slender, 1 to 3 in. long; tendrils 2- or 3-fid. Male racemes sometimes in pairs, longer than the leaves, few-flowered; bracts large, ovate to sub-orbicular, deeply incised or simply servate, glabrous or with viscid hairs; calyx-tube 1.5 in. long, tomentose or glabrous, the teeth lanceolate, the edges deeply serrate or laciniate. Female flower solitary, on a peduncle less than 1 in. long; fruit ovoid, pointed when young, globular when ripe, 1.5-2 in. in diam. T. palmata, Roxb. Flor. Ind. III, 704; Wall. Cat. 6688 (excl. C, F); W. & A. Prodr. 350; Wight Ill. t. 104, 105; Dalz. & Gibs. Bomb. Flor. 103. T. laciniosa, Wall. Cat. 6689 A, B. T. aspera, Heyne in Herb. Rottler. T. tricuspis, Mig. Flor. Ind. Bat. I, Pt. I, 679. T. cordata, Wall. Cat. 6686 (excl. A and B). T. anguina, Wall. Cat. 6687 (F partly); Voigt Hort. Bot. Sub. 58. T. bracteata, Kurz in Journ. As. Soc. Beng. 1877, Pt. II, 99; Cogn. in DC. Mon. Phan. III, 375. T. pubera, Blume Bijdr. 936; Ser. in DC. Prodr. III, 315; Roem. Syn. fasc. II, 95; Miq. Flor. Ind. Bat. I, Pt. I, 675. Cucurbita Melopepo. Wall. Cat. 6725. Involucraria Wallichii, Seringe in DC. Prodr. III, 318. Bryonia palmata, Wall. Cat. 6711 F.

PERAK; Wray 2181, 2371, 2478, 3049; King's Collector 1848, 4983, 10579. Andamans; King's Collector.

The fruit when ripe is usually globular; but there are specimens in the Calcutta Herbarium which have oval fruit like *T. Wallichiana*, Wight, and at the same time the scabrid leaves and laciniate onlyx lobes which are supposed to be characteristic of this species.

5. TRICHOSANTHES WALLICHIANA, Wight in Ann. and Mag. Nat. Hist. VIII, 70. Stem robust, angled and sulcate, glabrous. Leaves membranous, sub-orbicular in general outline, divided half-way down or more into 3-5 oblong or triangular acute lobes; the lobes sparsely denticulate, the lower on each side sometimes lobulate, the base deeply and widely cordate; both surfaces glabrous and usually smooth, the upper sometimes slightly scabrid and with a few glands near the apex of the petiole; length and breadth 3-7 inches, tendrils 3-fid. Male

peduncles at first shorter than the leaves, elongating with age; bracts oblong-ovate, their edges laciniate; calyx-tube glabrous, the teeth spreading, entire; petals obovate, laciniate. Female flower solitary; fruit ellipsoid, obtuse, smooth, 2-4 in. long. Cogn. in DC. Mon. Phan. III, 368. Involucraria Wallichiana, Ser. in Mem. Hist. Nat. Geneve III, Pt. I, 25 t. 5; in DC. Prodr. III, 318; Roem. Syn. fasc. 2, p. 98. Trichosanthes multiloba, Clarke in Hook. fil. Flor. Br. Ind. II, 607 (not of Miq.). T. grandibracteata, Kurz in Journ. As. Soc. Beng. XLVI, 98, 99.

PAHANG; Ridley 244. SINGAPORE; Ridley 296, 446, 4762. PENANG;

Curtis 2004. PERAK; Scortechini 508 and 600.

A species scarcely separable from T. pubera, Bl., of which in my opinion it would better be treated as a variety.

6. TRICHOSANTHES WAWREI, Cogn. in DC. Mon. Phan. III, 384. Stem slender, sub-glabrous, sulcate. Leaves membranous, trifoliolate or simple; leaflets of the trifoliolate form unequal, the middle one oblanceolate, the lateral ones angularly auriculate or lobulate at the base on the outer side, the edges of all subentire or sparsely denticulate and the apices much acuminate, all with slender petiolules 25-3 in, long; the lower surface reticulate when dry, glabrous, the upper sparsely and minutely pustulate and glabrous; length of the leaflets 2.5-5 in., breadth .75-1.5 in., petiole 1.25-2 in.; the simple form triangular-oblong, tapering gradually to the apex, the base with 2 short sub-horizontal lobules, length 2.5-5 in.; tendrils short, simple or bifid. Male peduncles shorter than the leaves, very stout, sulcate, glabrous, many-flowered; bracts small, oblong, their edges with a few long teeth, the flowers extending for half their length; calyx 5 in. long, narrowly campanulate, suddenly contracted into the tube, the teeth erectopatent or recurved, lanceolate, acuminate, entire. Female flower with cylindric tube slightly dilated at the apex, the teeth as in the male; petals white, yellowish at the base, oblong, 3-nerved, the fimbriæ long, the external surface minutely papillose; ovary, glabrous, ovoid-oblong; fruit subglobular when young, oblong when ripe, smooth, red with orange or white stripes; seeds compressed, oblong-ovoid, 6 in. long.

Perak; King's Collector 2203, 4519, 4668, 5380, 5405, 10176. Wray 2382; Scortechini. (SINGAPORE; Wawra 241 in Herb. Vindob.

fide Cogniaux.)

Cogniaux describes this as having its leaves always trifoliolate. But in some of the Perak specimens both trifoliolate and simple leaves as above described are to be found; in a few only simple leaves, and in the majority only trifoliolate.

7. TRICHOSANTHES CELEBICA, Cogn. in DC. Mon. Phan. III, 385. Stem slender, glabrous, sulcate, sometimes hairy at the nodes. Leaves coriaceous, trifoliolate; the leaflets unequal in size, the middle one

the largest, ovate-oblong, shortly acuminate or sub-acute; the base slightly narrowed, oblique, not cordate, the edges quite entire; both surfaces glabrous, minutely reticulate when dry, the upper minutely punctate; length of leaflets 3-4.5 in., breadth 1.5-2.5 in.; petiole 1-1.5 in. long, stout; petiolules 15 in.; tendrils short, bifid. Male peduncle shorter than or equal to the leaves, stout, deeply sulcate, adpressed-pubescent, floriferous for half its length; bracts deltoid, pectinate, tawny glandular-tomentose. Calyx-tube narrowly infundibuliform, minutely pubescent; the teeth lanceolate, acuminate, entire, erectopatent. Female flower unknown. Fruit ovate, smooth, 8 in. long and 3 or 4 in. in diam. with a leathery rind, bright red with 10 yellow stripes when ripe; seeds obliquely oblong, compressed, smooth, 6 in. long and 4 in. broad.

Perak; Wray 2460; Scortechini; King's Collector 4033. Singafore; Ridley 2051, 4592, 6783; Hullett 247. Distrib. Celebes, Beccari.

### 3. GYMNOPETALUM, Arn.

Twining herbs, tendrils usually simple or 2-fid. Leaves petioled, 5-angular, nearly entire or deeply lobed. Flowers white (or yellow?), somewhat large; occasionally monœcious; male peduncles in fully developed plants 2 from each axil, the earlier 1-flowered, the later longer with racemes, either often suppressed; bracts on the racemes persistent, large, lanceolate, incised or small; females 1-flowered, usually in separate axils. Male calyx-tube long, contracted near the mouth, limb of 5 lanceolate segments; petals 5, not fimbriate on the margin; stamens 3; anthers included, connate, elongate, 1-2-celled, cells conduplicate; rudiments of the ovary 1 or 3, small, linear. Female calyx and corolla as in the male; ovary oblong; style long, stigmas 3, short linear; ovules horizontal, many; placentas 3, long, vertical. Fruit ovate-oblong, acute at both ends. Seeds many or few, ellipsoid, compressed, margined, nearly smooth. Distrib. Species 6; in India, China and Malaya.

Leaves not lobed ... ... ... 1. G. integrifolium.

Leaves lobed :-

Leaves 3-5-lobed half way down, reniform to triangular in general outline; lobes triangular acute, not lobulate ... ... ...

Leaves deeply 5-lobed, the lobes lobulate-sinuate.

2. G. Cochinchinensis.

blunt, their general outline orbicular ... 3. G. quinqueloculare.

1. GYMNOPETALUM INTEGRIFOLIUM, Kurz in Journ. As. Soc. Beng. XL, 58. Creeping, only a few feet long; stem scabrid, tendrils simple or bifid. Leaves reniform, obtuse; the margin undulate or denticulate, not lobed; upper surface very scabrid, the lower softly tomentose,

length 1.75-2 in., breadth 8-2.25 in., petiole 45-65 in. Flowers monœcious, all solitary, axillary and bracteate, the male peduncle 1.5 in. long, the female only 25 in. Calyx-tube in both sexes elongate, densely covered with long brown hairs; the teeth 5, lanceolate; corolla white, about 1.35 in. in diam., its lobes obovate, entire, pubescent, veined. Fruit about 75 in. in diam., globular, smooth, orange-red. Kurz in Flora for 1871, p. 295; Clarke in Hook. fil. Flor. Br. Ind. II, 612. Cucumis integri folius, Roxb. Flor. Ind. III, 724; Wall. Cat. 6730. Trichosanthes officinalis, Walk Cat. 6694. T. integrifolia, Kurz in Journ. As. Soc. Beng. XLVI, Pt. II, 99; Cogn. in DC. Mon. Phan. III, 386.

PERAK; Wray 2167; Ridley 3107.

Kurz named this Gymnopetalium integrifolium in the Journal of the Asiatic Society of Bengal which was issued in March 1871. His publication of it in Flora dates only from October of the same year.

2. GYMNOPETALUM COCHINCHINENSIS, Kurz in Journ. As. Soc. Beng. XLVI, Pt. II, 57. Stems slender, angled, slightly scabrid-hairy. Leaves reniform to triangular in outline, 5-angled or 3-5-lobed half way down; the lobes triangular, acute, the edges crenate-dentate and thickened, the base deeply and widely cordate, both surfaces more or less scabrid, length 2 to 4 in., breadth 2 to 3.5 in.; petiole scabridpubescent, 1-1.5 in. long; tendrils simple or bifid. Male peduncle longer than the leaves, the flowers racemose, or sometimes solitary; bracts large, incised-serrate, 5-75 in. long; calyx-tube sub-cylindric, villous, the mouth closed by deflexed hairs, the teeth erecto-patent; petals ovate-oblong, 5 in. long, entire or sub-crenate. Peduncle of female flower shorter than the leaf-petiole, sparsely puberulous; fruit about 2 in. long. and '75 in. in diam., somewhat scabrid, 10-ribbed, orange-red, the beak long; seeds about 25 in. long. Kurz in Flora for 1871, p. 295; Clarke in Hook. fil. Flor. Br. Ind. II, 611; Cogn. in DC. Mon. Phan. III, 391. Bryonia cochinchinensis, Lour. Flor. Cochinch. 595; DC. Prodr. III, 305. Momordica tubiflora, Roxb. Flor. Ind. III, 711, (not of Wallich). Tripodanthera cochinchinensis Roem. Synops. II, 48. Scotanthus tubiflorus, Naud. in Ann. Sc. Nat. Ser. 4, XVI. 172, t. 3. Trichosanthes cucumerina, Wall. Cat. 6690 E. T.? Fatoa, Ham. in Wall. Cat. 6695. Bryonia grandis, Wall. Cat. 6700 K. L. Trichosanthes costata, Bl. Bijdr. 933; Ser. in DC. Prodr. III, 314.

PAHANG; Ridley 2446. KEDAH; Curtis 2592. PERAK; King's Collector 10563. DISTRIB. British India, Malayan Archipelago, China.

3. GYMNOPETALUM QUINQUELOBUM, Miq. in Flor. Ind. Bat. I, Pt. I, 681. A slender annual; stem striate, with short pubescence or glabrous. Leaves orbicular in general outline, deeply 5-lobed; the lobes sinuately 2- or 3-lobulate, or oblong and subentire; both surfaces sparsely covered with thick whitish hairs with bulbous bases, length 1.5-2.25 in., breadth 1.75-3 in.; petiole '75-1 in., sparsely pubescent. Male flowers usually solitary, rarely in racemes slightly longer than the leaves, shortly pilose; the bracts oblong, serrate, '5 in. long. Calyxteeth erect, entire or dentate; petals oblong, acute, puberulous outside. Peduncle of female flower '5-1 in. long. Fruit brilliant scarlet when ripe, oblong-fusiform, acutely ribbed, shortly pubescent, 1.5-2 in. long; seeds blackish, rugulose, obscurely marginate, narrowed to the base, '2 in. long and about '1 in. broad. Clarke in Hook. fil. Flor. Brit. Ind. II, 611; Cogn. in DC. Mon. Phan. III, 392. \*Scotanthus Porteanus, Naud. in Ann. Sc. Nat. Ser. V, Vol. 5, 25. Gymnopetalum heterophyllum, Kurz in Trim. Journ. Bot. for 1875, p. 326.

ANDAMAN AND NICOBAR ISLANDS; Kurz.

#### 4. LUFFA, Cav.

Climbers, large or small, pubescent or nearly glabrous; tendrils 2-5-fid. Leaves cordate, usually 5-angular or 5-lobed; petiole without glands at its apex. Flowers yellow or white, monoccious, males and females often from the same axil; females solitary or panicled, males on long or short racemes or clustered. Male; calyx-tube turbinate, lobes 5, triangular or lanceolate; petals 5, obovate; stamens 3, rarely 5, filaments 3, free or connate; anthers exserted, free, one 1-celled, the others 2-celled; cells sigmoid, often on the margin of the broad connective. Female; calyx-tube shortly produced above the ovary; lobes and corolla as in the male; ovary oblong, style cylindric, stigma 3-lobed; ovules very many, horizontal. Fruit large or small, oblong (not spherical), smooth or angular or spinous, ultimately fibrous, not succulent, 3-celled, usually circumscissile near the apex. Seeds many, oblong, compressed. Distrib. Species 6, in the warmer regions of the Old World and one in America.

LUFFA ÆGYPTIACA, Miller Gard. Dict. ed. VIII, ex Hook. fil. in Oliv. Flor. Trop. Afr. II, 530. Stem stout, many yards in length; the young branches glabrous, angled and very deeply sulcate; tendrils 2-3-fid. Leaves large, reniform or reniform-orbicular in general outline, palmately 5-lobed; the lobes acute, lobulate and denticulate; both surfaces scabrous or scaberulous, punctate, glabrous except the pubescent nerves on the lower surface; length 2·5-6 in., breadth 3-9 in., petiole 2-2·5 in., pubescent, eglandular. Male peduncle 6 in. long; the flowers 4-12, crowded near the summit, 1·5-2 in. in diam., their pedicels short, each with a small ovate viscid bract, or ebracteate; petals 5, yellow with green veins; stamens 5. Female flower solitary on a peduncle 1-3 in. long, usually from the same axil as the male inflorescence; fruit 5-12 in. long, sub-cylindric, with numerous bold ridges; seeds usually black,

narrowly winged, smooth or slightly tubercled. DC. Prodr. III, 303; Clarke in Hook. fil. Flor. Brit. Ind. II, 614. Cucumis aegyptiacus, Vesl. in Alp. Pl. Aegypt. p. 199, t. 58, 59. Momordica Luffa, Linn. Spec. ed. 1, 1009. L. pentandra, Roxb. Flor. Ind. 111, 712; W. & A. Prodr. 343; Wall. Cat. 6751; Wight Ic. t. 499. L. racemosa, Roxb. l. c. 715. L. clavata, Roxb. Hort. Beng. 104; Flor. Ind. III, 714. L. acutangula, W. & A. l. c., (not of Roxb.). L. cylindrica, Roem. Synops. II, 63; Naud. in Ann. Sc. Nat. Ser. 4, XII, p. 119; Kurz in Journ. As. Soc. 1877, Pt. II, 100; Gogn. in DC. Mon. Phan. III, 456. L. Petola and L. Cattu-picinna, Seringe in DC. l. c. L. Parvala, Wall. Cat. 6758. L. Gosa, hederacea and Satpatia, Wall. Cat. 6753, 6755, 6757. Bryonia cheirophylla, Wall. Cat. 6715 A.

PERAK; King's Collector 1020. DISTRIB. British India and in the

Tropics generally; often cultivated.

The synonymy of this species occupies more than a page in Cogniaux's excellent Monograph of the Cucurbitaceæ in De Candelle's Suites au Prodromus, Vol. III. I have followed Messrs. Cogniaux and C. B. Clarke in reducing here Roxburgh's three species L. pentandra, L. racemosa and L. clavata, but I do so with considerable hesitation. Neither in flower nor leaf do Roxburgh's figures of his L. clavata and L. pentandra much resemble each other, whatever relation either of them may bear to M. Aegyptiaca, Miller. The material of the Indian species in the Calcutta Herbarium is very nusatisfactory, and I do not think the last word on them will be said until they have been carefully cultivated side by side, and studied as they grow.

# 5. Benincasa, Savi.

A large climber, softly hairy, tendrils 2- or 3-fid, rarely simple. Leaves cordate, reniform-orbicular, more or less 5-lobed; petiole without glands. Flowers large, yellow, monocious, all solitary, without bracts. Male; calyx-tube campanulate; lobes 5, leaf-like, serrate; petals 5, nearly separate, obovate; stamens 3, inserted near the mouth of the tube; anthers exserted, free, one 1-celled, two 2-celled, cells sigmoid. Female; calyx and corolla as in the male; ovary oblong, densely hairy; style thick, with 3 flexuose stigmas; ovules numerous, horizontal; placentas 3. Fruit large, fleshy, oblong, pubescent, indehiscent. Seeds many, oblong, compressed, margined.

Benincasa Hispida, Cogn. in DC. Mon. Phan. III, 513. Annual. Leaves on long petioles, reniform-rotund, with 5-9 small lobes, all toothed, 4-6 in long and about the same in breadth; petioles cylindric, longer than the leaves, tendrils usually 3-fid. Male flowers axillary, solitary, peduncled, yellow, 1.5 in, in diam.; teeth of the calyx obtusely pinnatifid or undulate. Female flowers like the male, axillary, solitary, peduncled; calyx as in the male. Fruit sub-cylindric, obtuse at the ends, smooth, hairy when young but glabrous and with a whitish

bloom when ripe, 12-18 in. long and from 8-10 in. in diam. Seeds white with tumid margins, '5 in. long and '15 in. broad. Cucurbita hispida, Thunb. Flor. Jap. (1784), p. 322; Bl. Bijdr. 931; Wall. Cat. 6723. C. Pepo, Lour. Flor. Coch.-Chin. p. 593; Roxb. Flor. Ind. III, 718 (not of Linn.). Benincasa cerifera, Savi in Bibl. Ital. IX, 159; DC. Prodr. III, 303; W. et Arn. Prodr. 344; Miq. Flor. Ind. Bat. I, Pt. I, 665; Clarke in Hook. fil. Flor. Br. Ind. II, 616. Cucurbita villosa, Bl. Bijdr. 931; DC. Prodr. III, 317. C. farinosa, Bl. Bijdr. 931. Cucurbita alba, Roxb. in E. Ind. Comp. Mus., tab. 457 (ex W. et Arn.). Gymnopetalum septemlobum, Miq. Flor. Ind. Bat. I, Pt. I, 679. Lagenaria dasystemon, Franch. et Sav. Enum. Pl. Jap. I, 173.

NICOBAR AND ANDAMAN ISLANDS; cultivated, King's Collectors. DISTRIB.—Malayan Archipelago, Australasia, China, Philippines, British India; cultivated.

## 6. Momordica, Linn.

Climbing by simple tendrils. Leaves cordate, petioled, undivided in the Indian species. Flowers yellow or white, monœcious or diœcious, females solitary, peduncled; males solitary or racemed, bracteate or not. Male; calyx-tube short, campanulate with 2-3 basal oblong incurved scales (ex Hook. f.) lobes 5; corolla 5-partite nearly to the base; stamens 3; filaments short; anthers at length free, one 1-celled, one or two 2-celled, cells conduplicate or horse-shoe-shaped. Female; calyx and corolla as in the male; ovary oblong; style long, stigmas 3; ovules very many; placentas 3, horizontal. Fruit oblong or spherical, rough or smooth, indehiscent or 3-valved, many- or few-seeded. Seeds obovate or complanate, smooth, corrugate or sculptured. Distrib.—Species 25, chiefly in the warmer parts of Africa, several in Tropical Asia, a few in Tropical America.

Leaves entire :--

Male pedicels ebracteate ... ... 1. M. Clarkeana.

Male pedicels with a bract close to the flower ... 2. M. subangulata.

Leaves 3-lobed, the lobules entire ... ... 3. M. Cochinchinensis.

Leaves 5-7-lobed, the lobules sinuate-dentate or lobulate ... ... ... 4. M. Charantia.

1. Monordica Clarkeana, n. spec. King. Stem slender, 4-angled, glabrous, 20-30 feet long. Leaves thinly membrauous, broadly ovate, never lobed, acute, the base deeply cordate or emarginate, both surfaces quite glabrous; length 3-5 in., breadth 3-4 in.; petiole 1-5-2 in., slender, eglandular. Male flowers 75 in. in diam., on filiform pedicels several form a leaf-axil, or in few-flowered lax racemes; calyx-lobes puberulous, broad, obtuse, their margins membranous and glabrous; corolla deeply divided into 5 broad blunt lobes, puberulous. Female flower unknown.

Fruit vermillion when ripe, sub-globular, apiculate when young glabrous; without ridges or papillæ, 2-2.5 in. in diam.; seeds as in M. Cochinchinensis.

Perak; Scortechini 1605; King's Collector 8340; Wray 3273.

This species is allied to M. Cochinchinensis and has seeds exactly alike those of that species. But the leaves of this are of thinner texture than those of M. Cochinchivensis, and they are not lobed; moreover the petiole in this is eglandular, and the fruit is quite free from ridges or papillæ of any kind. I have named it in honour of my friend Mr. C. B. Clarke who believes with me that it is a hitherto undescribed species.

Momordica subangulata, Blume Bijdr. 928. Stem slender. glabrous, angled, sulcate, several feet long; tendrils single. Leaves broadly ovate, deeply cordate at the base, the apex acute, the edges with remote cartilaginous teeth; upper surface glabrous, the lower with sparse small adpressed hairs; length 1.75-2.25 in., breadth 1.25-1.65 in.; petiole 1 in. long, glabrous, eglandular. Male peduncle 5-1 in. long, pubescent; the bract close to the flower broader than long, its apex obtuse, its base cordate, minutely pubescent, the veins prominent; flower nearly 1 in. in diam.; calyx deep purple; its lobes oblong, obtuse, glandular, nearly '2 in. long; corolla yellow, partite to the base, the segments oblong. Female flower unknown; fruit ellipsoid, 2-3 in. long, obscurely ribbed, the ribs broken into joints. Ser. in DC. Prodr. III, 316; Roem. Syn. fasc. 2, p. 58; Miq. in Flor. Ind. Bat. I, Pt. I, 664; Kurz in Journ. As. Soc. Beng. XLVI, Pt. II, 102; Cogn. in DC. Mon. Phan. III, 443.

PERAK; Scortechini 399. DISTRIB. Java, Brit. India.

3. Momordica Cochin-Chinensis, Spreng. Syst. Veg. III, 14. A powerful climber ascending tall trees; stem angled, glabrous. Leaves in general outline sub-orbicular or broadly ovate, the base cordate or emarginate, usually 3-lobed to the middle or below it (sometimes 5lobed), the margins with sparse umbilicate glands, both surfaces glabrous, length 4-7 in., breadth nearly the same; petiole 2-3 in. long, glandular at the middle and upper part; tendrils long, stout, simple. Male peduncle 2-6 in. long with an orbicular-remiform cucullate bract at its apex embracing the flower-bud; calyx-segments dark, coriaceous, hairy; corolla 1.75-3 in. across, white tinged with yellowish, some of the petals with black spots at the base, others with yellow glands. Female peduncle 1-2 in. long, (longer in fruit), with a small bract about the middle. Fruit ovate, pointed at the apex, fleshy, bright red and covered with conical points but not ribbed; 4-5 in. long; seeds numerous, blackish, ovate, compressed, sculptured, the margins undulatesub-lobulate. Kurz in Journ, As. Soc. Beng. XLVI, Pt. 2, 102; Clarke in Hook, fil. Flor. Br. Ind. II, 618; Cogn. in DC. Mon. Phan. III, 444.

M. mixta, Roxb. Hort. Beng. 70; Flor. Ind. III, 709; Wight & Arn. Prodr. 349; Roem. Syn., fasc. 2, 59; Hook. in Bot. Mag. t. 5145; Miq. Flor. Ind. Bat. 1, Pt. 1, 664; Naud. in Ann. Sc. Nat. Ser. 4, XII, 132. M. dioica, Wall. Cat. (not of Roxb.) 6750, A to F. Muricia Cochinchinensis, Lour. Flor. Coch.-Chin. 733; Ser. in DC. Prodr. III. 318.

PERAK; Scortechini, King's Collector, Wray; a common plant. DISTRIB.—British India, Malaya, Philippines.

4. Momordica Charantia, Linn. Sp. Pl. ed. I. p. 1009. Stem slender, branching, striate, pubesceut, sometimes tomentose towards the apex, 3-6 feet long. Leaves reniform-orbicular in general outline. 1-3 in. in diam., deeply divided into 5-7 lobes; the lobes sinuate-dentate or lobulate and mucronate, constricted at the base, glabrous or slightly pubescent; petiole 1-3 in.; the tendrils simple. Male peduncle slender, with a reniform or orbicular bract at or below the middle. Male flower ·35-·75 in. in diam.; the calvx-lobes ovate, acute; corolla somewhat irregular, vellow, its segments obtuse or emarginate, anther cells much bent. Female peduncle 2-4 in. long, slender, bracteate near the base; ovary fusiform, muricate. Fruit 1-3 in. long, evoid, tapering to both ends, many-ribbed and bearing numerous triangular tubercles. Seeds compressed, sometimes almost 3-toothed, the margins corrugated the sides sculptured. Lour. Flor. Cochchin. II, p. 598; Bot. Mag. t. 2455; Ser. in DC. Prodr. III, 311; Roxb. Flor. Ind. III, 707; Wight and Arn. Prodr. 348; Torr. and Gray Flor. N. Amer. I, 543; Wight Ic. tab. 504; Wight Ill. t. 105 bis; Mig. Flor. Ind. Bat. I, Pt. I, 663; Cogn. in Mart. Flor. Bras., fasc. 78, p. 14; Clarke in Hook. fil. Flor. Br. Ind. II, 616. Cogn. in DC. Mon. Phan. III, 436. M. muricata, Willd. Spec. IV, 602; Roxb. Flor. Ind. III, 707; W. & A. Prodr. 348; Mig. Flor. Ind. Bat. I, Pt. I, 663. M. humilis, Wall. Cat. 6747. M. anthelmintica, Schum. et Thou. Flor. Guin. 423. M. Roxburghiana, Don Gen. Syst. Gard. III, 35. M. macropetala, Mart. in Hook. Journ. Bot. V, 504.

PERAK; Scortechini. DISTRIB. Malayan Archipelago, British India, China, Tropical Africa and America.

# 7. MELOTHRIA, Linn.

Climbing herbs; tendrils simple or 2-fid. Leaves petioled, deltoid, truncate or hastate, entire or deeply 3-lobed, little hairy, often punctate. Flowers small, white, usually monocious, males and females often from the same axil; male pedicels long, clustered (rarely sub-solitary) in the axils, or clustered on long racemes resembling branches without leaves; female long-pedicelled. Male; calyx-tube short, teeth 5, small; corolla 5-partite; stamens 3, inserted in the middle of the calyx-tube; anthers free, one 1-celled, two 2-celled; cells free, straight, simple, more or less

lateral; connective prolonged, undivided, glabrous. Female calvx and corolla as in the male; ovary oblong, style long; stigmas 3, subglobuse; ovules many, horizontal; placentas 3, vertical. Fruit indehiscent, globose, acute or fusiform, subrostrate. Seeds many, small, oblong, much compressed, obscurely margined, smooth or very nearly so. Dis-Species about 55, all tropical.

Fruit not beaked :-Fruit globular, glabrous ... 1. M. affinis. Fruit oblong, glabrous 2. M. indica. Fruit beaked :-

Fruit fusiform, beaked, velvety ...

... 3. M. marginata. 1. Melothria affinis, n. spec. King. Scandent; the stem slender. glabrous, 4-angled and deeply sulcate, not rooting at the nodes; the tendrils rather stout, bifid. Leaves ovate-cordate to triangular, often 3-5-lobed, the edges denticulate; upper surface densely scabrid-hispid, the hairs white; the lower paler and with hairs of the same colour but sparser and more slender; length 1.35-4.25 in., breadth 1.5-3.25 in., petiole 5-1 in. Male and female flowers often from the same axil; the males in many-flowered umbels on pedicels twice as long as the leaf-petioles, pubescent below, glabrous above; pedicels about 20, slender. unequal, dilated at the apex, glabrous, 25-35 in. long. Flowers 1 in. in diam., globose, pubescent, with 5 slender short diverging subulate teeth below the mouth. Petals not seen; unthers 3, straight, the connetive not produced. Pedicel of the fruit shorter and stouter than the peduncle of the male umbel, glabrous. Fruit globose, glabrous, thinwalled, many-seeded, red when ripe, 4-5 in. in diam.; seeds obovoid, pitted, somewhat compressed, pale.

Perak; Scortechini 495; Wray 860, 1404; Curtis; King's Collector 1069, 2539. Borneo; Bangermassing; Motley 167.

Mr. C. B. Clarke, who was so good as to examine my specimens of this species and to compare them for me at Kew, assures me that the Perak specimens agree exactly with Motley's 167. Mr. Clarke considers the species as closely allied to M. marginata, Cogn. from which it differs by its globular glabrous fruit.

MELOTHRIA INDICA, Lour. Flor. Coch. China, 35. filiform, glabrous, 3-6 feet long, often rooting at the nodes, the tendrils simple. Leaves triangular-cordate, acute, entire or 3-lobed (sometimes deeply); the nerves somewhat hairy, otherwise glabrous, the lobes irregularly denticulate or lobulate; length 1.25-2 in. and breadth the same, petiole 6-1 in. Male pedicels solitary or in racemes of 2 or 3 on peduncles 1 in. long; calyx-tube broadly campanulate, its teeth subulate, spreading; corolla white, puberulous, its segments ovate-oblong. Stamens with thick obconic filaments, glabrous or sparsely villose; unthers ovate-oblong, ciliate, the connective much produced. Peduncle

of female flower solitary, longer that the leaf-petiole. Fruit oblong, glabrons, white, 5-75 in. long. Seeds ovate, attenuate at the base. Ser. in DC. Prodr. III, 313; Naud. in Ann. Sc. Nat., Ser. 4, XVI, 169 t. 2; Hance Suppl. Hongkong Flora, 104; Kurz in Journ. As. Soc. Beng. XLVI, Pt. II, 105; Clarke in Hook. fil. Flor. Br. Ind. II, 626. Bryonia geminata, Blume Bijd. 924; Ser. in DC. Prodr. III, 305; Roem. Syn., fasc. II, 35; Miq. Flor. Ind. Bat. I, Pt. I, 659. B. tenella, Roxb. Flor. Ind. III, 725. Aechmandra indica, Arn. in Hook. Journ. Bot. III, 274; Wight in Ann. and Mag. Nat. Hist. VIII, 267; Miq. Flor. Ind. Bat. I, Pt. I, 658.

SELANGORE; King's Collector 360. DISTRIB. British India, Cochin-China, Philippines, Hongkong.

MELOTHRIA MARGINATA, Cogn. in DC. Mon. Phan. III. 593, Stem creeping, rooting at the nodes, angular, sulcate, glabrous; the tendrils slender, simple, puberulous. Leaves ovate-cordate or more or less 3-lobed, acute; the edges minutely and distantly denticulate: the upper surface coarsely and distinctly and the lower minutely and more closely strigose, the nerves on both pubescent; length l-1.25 in., breadth 1-1.75 in.; petiole .75-1.5 in., tomentose. Male flowers umbellate on a filiform few-flowered peduncle shorter than the petiole, glabrous: the pedicels erect, 2-3 in. long; the calyx broadly campanulate, pubescent, its teeth subulate. Petals villose, yellow; anthers glabrous, inappendiculate. Female flower solitary on a peduncle 5 in. long. Fruit narrowly cylindric, beaked, tapering to the base, velvety, '75 in, long, its peduncle filiform; seeds 6-8, foveolate. Bryonia marginata, Blume Bijdr. 924; Ser. in DC. Prodr. III, 305; Roem. Syn., fasc. II, p. 36; Miq. Flor. Ind. Bat. I, Pt. II, 660, B. epigæa, Blume Bijdr. 924; Ser. in DC. Prodr. III, 306. Aechmandra Blumeana, Roem. Syn. fasc. II, p. 33; Miq. Flor. Ind. Bat. I, Pt. II, 657. Melothria Rumphiana, Scheff, Ann. Jard. Bot. Buitenz. I, 25. Cerasiocarpum? Maingayi, Clarke in Hook. fil. Flor. Br. Ind. III, 629.

Malacca; Maingay (Kew Distrib.) 1268. Perak; King's Collector 874. Distrib. Java and Sumatra.

Var. heterophylla, Cogn. in DC. Mon. Phan. III, 594. Leaves quite entire, ovate-cordate or oblong-sub-hastate, scabrous above, almost smooth beneath but hairy on the nerves. Bryonia heterophylla, Blume Bijdr. 925; Wall. Cat. 6704; Roem. Syn., fasc. II, 35. B. Blumei, Ser. in DC. Prodr. III, 305; Miq. Flor. Ind. Bat. I, Pt. I, 659. Cerasiocarpum? penangense, Clarke in Hook. fil. Flor. Br. Ind. III, 629.

PENANG; Wallich; Curtis 1928. DISTRIB. Java.

#### NOTE.

which Mr. C. B. Clarke, (who elaborated the family of Cucurbitaceæ for Hooker's Flora of British India, and who kindly compared my Malayan material in the Kew Herbarium) considers as probably new.

But, as these want either flowers or fruit, I am obliged to leave them undescribed. The chief amongst these are Perak, Wray 2228 and 3416; and Andamans, King's Collector 2200.

## 8. GYNOSTEMMA, Blume.

Climbing herbs, tendrils simple. Leaves pedate; leaflets 3-5, ovate-lanceolate, serrate, membranous. Flowers small, diœcious, in axillary diffuse panicles, greenish. Male flower; calyx short, with 5 small lobes; corolla rotate, 5-partite, with lanceolate segments; stamens 5, filaments connate below; anthers 2-celled, the cells straight and elongate. Female flower, calyx and corolla as in the male; ovary rotund, 2-3-celled; styles 2 or 3, united below, bifid at the apex; ovules 2 in each cell, pendulous. Fruit globose, umbonate, indehiscent, as large as a pea, 1-3-seeded. Seeds wingless, verrucose, sub-muricate. Species 4; all Indo-Malayan.

GYNOSTEMMA PEDATA, Blume Bijdr. 23. Slender, 10-20 feet long; young branches and leaves puberulous or glabrous, rarely pubescent. Leaves membranous, trifoliolate or pedate, the petioles 1-1.5 in. long; leaflets 3-7, ovate-oblong, lanceolate or oblanceolate, unequal, the middle the longest, their apices acute or sub-acute, the bases narrowed and sometimes oblique, the edges crenulate or crenate-dentate; length \*75-2.5 in., breadth '4-1 in., the petiolules '1-2 in. Panicles longer than the leaves, 3-6 in. or even a foot long, slender, sparsely branched, more or less coarsely pubescent. Calyx-segments triangular, acute; segments of corolla 1-nerved, ciliate-dentate. Fruit 15 in. in diam. Seeds trigonous. Roem. Syn., fasc. II, p. 110; Miq. Flor. Ind. Bat. I. Pt. I, 683; Clarke in Hook. fil. Flor. Br. Ind. II, 633; Cogn. in DC. Mon. Phan. III, 913. G. laza, Cogn. Mon. Phan. III, 914; Zanonia laza, Wall. Cat. 3727; Pl. As. Rar. II, 29; Arn. in Hook. Journ. Bot. III, 272 (in note). Zanonia cissoides, Wall. Cat. 3726; Pl. As. Rar. II, 28. L. Wightiana, Arn. Pugill. 38; Nov. Act. Acad. Nat. Cur. 18, Pt. I, 356; Roem. Syn., fasc. II, 117. Alsomitra laxa, Roem. Syn., fasc. II, 118. Pestolozzia laza, Thw. Enum. Pl. Zeyl. 124. P. pedata, Zoll. et Moritz. Syst. Verz. p. 31. Alsomitra cissoides, Roem. Syn., fasc. II, 118. Enkylia trigyna, Griff. Pl. Cantor. 27; Miq. Prol. Flor. Jap., pp. 15 and 142. E. digyna, Griff. Pl. Cantor. 27. Zanonia pedata, Miq. Flor. Ind. Bat. I, Pt. I, 683. Gynostemma cissoides, Franch. et Sav. Enum. Pl. Jap. I, 176. Vitis atroviridis, Wall. Cat. 6040; Vitis trichophora, Wall. Cat. 9032.

PERAK; King's Collector 2306. DISTRIB. Malayan Archipelago, British India and Tonkin.

This plant varies as to the number of its leadets in its leaves and as to pulsescence. The pedate forms with 5-7-puberulous leadets have been by some authors, (among whom is M. Cogniaux, the latest monographer of the Cucurbitaceæ) considered as belonging to a different species from the plants with trifoliolate glabrous shining leaves; and the latter has been named G. laxa. After carefully examining about a hundred specimens collected in different parts of British India and Malaya, I find so many that unite to some extent the characters relied upon as distinctive that I have been driven, with all respect to M. Cogniaux, to adopt Mr. Clarke's view that there is but a single species.

## 9: ZANONIA, Linn.

Climbing herbs; tendrils simple. Leaves long-petioled, simple, ovate or oblong. Flowers small, diocious, in large compound pendulous racemes, males pedicelled, females subsessile. Male; sepals 3, oblong or orbicular, concave; corolla rotate, 5-partite, the segments subacute; stamens 5, free, inserted on a fleshy disc, filaments very short; anthers 1-celled, transversely oblong. Female; calyx and corolla as in the male; ovary sub-clavate, at first 3-celled; styles 3, spreading, 2-fid at the apex; ovules in each cell 2 or many, pendulous, attached in 2 series to a fleshy parietal placenta. Capsule large, elongate-cylindric, clavate, 3-valved at the truncate apex. Seeds large, oblong, pendulous, compressed, surrounded by a large membranous wing. Distrib. Species 3; British India, Malaya.

Leaves ovate-oblong; fruit 2.5 in. long ... 1. Z. indica.

Leaves ovate-rotund; fruit 5-8 in. long ... 2. Z. Clarkei.

1. Zanonia indica, Linn. Spec. Pl. ed. II, 1457. Slender, climbing to the extent of 30-50 feet, glabrous. Leaves coriaceous, ovate-oblong, acute; the base 3-nerved, rounded or somewhat emarginate; main nerves 6-8 pairs, curved, spreading, prominent beneath; length 3.5-6 in., breadth 2-3.5 in., petiole 65-8 in. Fruit cylindric-campanulate, glabrous, the apex truncate, 2.5 in. long; seeds flat, thin, 1.5-1.75 in. long; the nucleus oval, only 6 in. long, the rest being wing. Blume Bijdr. 937; Ser. in DC. Prodr. III, 298; Roem. Syn. fasc. II, 117; Wight and Arn. Prodr. 340; Wight Ill. t. 103; Miq. Flor. Ind. Bat. I, Pt. I, 682; Thwaites' Enum. Pl. Zey. 124, 442; Clarke in Hook. fil. Flor. Br. Ind. II, 633; Trimen Flora Ceylon II, 261.

Perak; King's Collector 7198, 7362.

2. Zanonia Clarkei, n. spec. King. Slender, 60-80 feet long, glabrous, the young branches deeply grooved. Leaves coriaceous, ovaterotund, acute; the base broad, emarginate or slightly cordate, with 5-7 nerves radiating from the apex of the petiole (the lateral one on each side small); length 2.5-3.5 in., breadth 2.5-3 in., petiole 75 in., tendrils bifid. Flowers unknown. Fruit ovoid-cylindric, smooth, 5-8 in. long,

and 3 in. in diam. Seeds flattened, about 'l in. thick, ovate, with 6 unequal deep narrow marginal lobes (those at the ends being the longest), the seed proper or nucleus papillose, 1 in. long and '75 in. broad, surrounded on all sides by a thin membranous wing nearly 1 in. wide.

PERAK; King's Collector 7230.

This fine species is known only from a single gathering of six specimens, none of which bears a flower. My friend Mr. C. B. Clarke, F.R.S., who was so kind as to compare for me at Kew the whole of my Malayan Cucurbits, notes on this as follows: "This is either a new Zanonia near Z. indica, Linn., or a new Alsomitra near A. Capricornica, F. Müll.—I think a Zanonia, whether the sepals turn out to be 5 or not. The 2-fid cirrhi may do for either genus. The spinose-margined seeds are not like those of Zanonia; but the ovoid, or sub-globose fruit is like nothing out of section Macrosanonia, Cogn. I call it Zanonia, n. spec."

# 10. ALSOMITRA, Bth. & Hk. f.

Large climbers; tendrils simple or 2-fid. Leaves with 3 oblong entire leaflets. Flowers small, diœcious, white, in compound panicles with filiform branches. Male; calyx rotate, 5-partite, segments oblong, acute; corolla rotate, 5-partite, segments obtuse; stamens 5, filaments short, near together at the base; anthers small, oblong, straight, 1-celled. Female; calyx and corolla as in the male; ovary elongate-clavate, 1-celled; styles 3-4, conical, with semi-lunate stigmas; ovules very many, pendulous; placentas 3, thick, vertical, parietal. Capsule large, elongate-clavate, truncate and 3-valved at the apex. Seeds very many, compressed, vertical, in six rows, much corrugated, incised or horned on the margin with a terminal membranous wing longer than the seed. Distrib. Species 9; British India, Malaya, North Australia, S. America.

ALSOMITRA CLAVIGERA, Roem. Syn. fasc. II, p. 118. A slender glabrous climber. Leaflets fleshy, the middle the largest, oblong or oblong-lanceolate, the apex obtuse, the base narrowed, the edges entire, subsessile, eglandular, length 1.5-3 in., breadth 65-1 in. Panicles slender, twice as long as the leaves, longer in fruit. Capsule smooth, 1.25-1.5 in. long and 4 in. broad. Seeds dark, cinereous, shortly muricate. Cogniaux in DC. Mon. Phan. III, 927; Hook. fil. in Bot. Mag. t. 6017; Clarke in Hook. fil. Flor. Br. Ind. II, 634. Zanonia sarcophylla, Wall. Cat. 3724; Pl. As. Rar. II, 28, t. 133.

KEDAH; Curtis 2504.

# Ordered LVI. ARALIACEÆ.

Trees or shrubs, very rarely herbs, often scandent, sometimes prickly. Leaves alternate, the uppermost rarely sub-opposite, long-

petioled, large, simple or compound; stipules adnate to the petiole, sometimes inconspicuous or 0. Flowers regular, small, often polygamous, in umbels racemes or umbellate panicles; bracts and bracteoles small or conspicuous; pedicels continuous with the base of the calyx or jointed. Calyx-tube adnate to the ovary; limb truncate, obsolete or with small teeth. Petals 5, rarely 6-7 or many, valvate or sub-imbricate, expanding or calyptrate. Stamens as many as and alternate with the petals (very many in Tupidanthus), inserted round an epigynous disc. Ovary inferior, 2-celled, or cells as many as the stamens, or 1-celled; styles as many as the cells, distinct or united; ovules solitary and pendulous in each cell. Fruit coriaceous or drupaceous, usually small, one or more cells sometimes suppressed. Seed pendulous, albumen uniform or ruminate; embryo minute, radicle next the hilum. Distrib. Species 400, chiefly tropical and subtropical, a few in the cool temperate zones.

Petals imbricate (slightly); pedicels of flowers jointed :-Styles 2-5, free; leaves compound ... 1. ARALIA. Styles 3 or 4, free; leaves simple, entire, lobed or pinnatifid; ovary 1-celled 2. ARALIDIUM. Petals valvate; stamens not exceeding 12:-Albumen uniform, ovary 4-12-celled, pedicels continuous with the flower, leaves simple or digitately compound :-Fruit boldly ridged, never more than 3 in. long; leaves usually compound ... HEPTAPLEURUMA Fruit succulent, ovoid-rotund, '5 in. in diam.; leaves simple, large, rotund-reniform, lobed TREVESIA. Fruit succulent, '3 in. in diam., obscurely ridged; leaves simple, entire (palmately lobed in young shoots) ... 5. DENDROPANAX. Albumen ruminate:-Ovary 1-celled :-Ovary 1-ovulate, leaves compound ... ... 6. ARTHROPHYLLUM. Ovary with 2 ovules; fruit 2-celled, 2-seeded, leaves simple WARDENIA. Ovary 2-celled, pedicels continuous:-Style distinct; leaves pinnately decompound ... 8. HETEROPANAX. Styles combined; leaves digitate, palmate or angled ... ... 9. BRASSATOPSIS. Ovary 4- or 5-celled, pedicels jointed ... 10. HETEROPSIS. Petals valvate; stamens 30-50 ... 11. TUPIDANTHUS.

#### 1. ARALIA, Linn.

Herbs, shrubs or small trees, glabrous, hairy or prickly. Leaves alternate or whorled, digitate, pinuate or compound-pinnate; leaflets

serrate or nearly entire; bracts and stipules not prominent. Umbels solitary or in racemes or panicles, rarely in compound umbels; pedicels usually jointed dose under the flower. Flowers often polygamo-monecions. Calyx with its margin truncate or 5-toothed. Petals 5, ovate, imbricate in bud. Stamens 5. Ovary 2-5-celled; styles 2-5, free or shortly connate at base. Fruit 4-5-celled, 4-5-angular, or subglobose, 2-3-celled. Albumen uniform. Distrib. Species about 50; extending from India and Malaya to Japan and North America.

Leaflets entire or minutely serrulate, densely ferrugineoustomentose on the lower surface ... ... 1. A. Thomsoni.

Leaflets coarsely and somewhat unequally serrate, the lower
surface with scattered flexuose white hairs ... 2. A. armata.

Leaflets obscurely undulate-serrate; quite glabrous on both
surfaces, the lower sub-glaucous ... ... 3. A. ferox.

1. Aralia Thomsoni, Seem. Rev. Hed. 91. A large prickly shrub, all parts more or less softly pubescent or tomentose. Stem slender, the prickles remote. Leaves large, 2-3-pinnate; leaflets thickly membranous, 5-9 in each ultimate pinnule, ovate-lanceolate, acuminate, the base rounded and somewhat oblique; the petiolules of all except the terminal very short (usually less than '1 in. long), that of the terminal leaflet '5 in. or upwards, the edges entire or minutely serrulate; upper surface sparsely strigose, the nerves and midrib pubescent; the lower softly tomentose; length 2.5-3.5 in., breadth 1-1.75 in. Panicles 15-20 in. long, with short sub-horizontal branches; the ultimate branches umbellate; the bracts narrowly lanceolate, 25 in long. Fruit '15 in. long, somewhat wrinkled, glabrous, the ridges broad. Clarke in Hook. fil. Flor. Br. Ind. II, 723.

Pahang; Ridley 2450. Penang; King's Collector 1574; Curtis 462. Perak; King's Collector 7807, 8704, 10045.

2. Aralia armata, Seem. Rev. Hed. 91. A prickly shrub; stem slender, almost glabrous except the puberulous young parts. Leaves very large, 3-pinnate, the rachises puberulous; leaflets thinly membranous, 9-11 in each ultimate pinnule, ovate-lanceolate, acuminate, the edges coarsely and somewhat nnequally serrate; the base rounded, slightly oblique or sub-cordate; sessile except the terminal one; petiolule of the terminal leaflet under 1 inch; length of leaflets 3-5 in., breadth 1.5-2 in.; upper surface with a few sparse adpressed hairs, otherwise glabrous; lower with scattered white flexuose hairs especially on the nerves and midrib. Panicle 15-18 in. long, pubescent in its ultimate 3-fid branches, the lower part glabrous, ultimate branchlets umbellate; the pedicels slender 3-4 in. long, tomentose. Fruit nearly 2 in. long, glabrous; the ridges broad, flat. Kurz For. Flora Burma, I, 536;

Clarke in Hook. fil. Flor. Br. Ind. II, 723. Panax armatum, Wall. Cat. 4933; G. Don. Gen. Syst. III, 386.

Kedah; Curtis 2526. Distrib. British India; in Burma, the Khasia. Hills and on the lower slopes of the Eastern Himalaya.

3. Aralia ferox, Miq. Flor. Ind. Bat. I, Pt. I, 750. A fax spreading glabrous shrub, often scandent to 20 or 30 feet; the stems, branches, rachises of the leaves and inflorescence bearing numerous short recurved spines. Leaves 2-3-pinnate, the pinnæ 3 or 4 pairs; leaflets subcoriaceous, 3-5 in a pinna, the pairs opposite, ovate, acute, the bases rounded, the edges obscurely undulate-serrate; both surfaces glabrous, the upper shining when dry, the lower sub-glaucous; length 1-2 in., breadth '75-1 in.; petiolules unequal, the lateral '15-3 in., the terminal '5-65 in. long. Panicle terminal, 8-15 in. long and 6 in. across, with numerous slightly compressed horizontal branches, themselves branching and ultimately ending in numerous peduncled umbels of 10-15 long-pedicelled oblong flowers '1 in. long; the pedicels slender, '3-5 in. long. Calyx-tube campanulate, 10-ridged, the limb with 5 small triangular acute teeth. Petals ovate. Fruit ovate-globose, boldly 5-ridged, rather more than '1 in. long.

Perak; Scortechini 142, 501; King's Collector 1037, 4434, 5089, 8438, 10568; Wray 2155.

# 2. Aralidium, Miq.

Leaves large, simple, usually deeply lobed or pinnstifid, glabrous. Flowers male or hermaphrodite, in large compound panicles, minute. Calyx-teeth triangular, spreading, the tube campanulate. Petals 5, imbricate. Stamens 5. Ovary usually 3-celled, two of the cells soon aborting. Styles distinct, subulate. Fruit obliquely ovoid, drupaceous, 1 inch or more in length, 1-seeded; the seed solitary, rugose, pendulous, vertically sulcate; albumen very copious, coarsely ruminate, penetrated by outgrowing folds from the funicle; embryo small. Distrib; two species, both Malayan.

This is a remarkable genus of doubtful position. The large solitary seed, with a much developed funicle forming an expansion at the base of the coarsely ruminated albumen and sending processes into the latter, and the unisexual habit make it doubtful whether it should not be placed in Cornaces (to which Seemann referred it), rather than in Araliaces.

ARALIDIUM PINNATIFIDUM, Miq. Flor. Ind. Bat. I, 763, t. 13. A small tree without prickles, glabrous except the inflorescence. Leaves thinly coriaceous, irregularly lobed or coarsely pinnatifid, rarely entire and narrowly elliptic; length of the lobed or pinnatifid forms 10-18 in., breadth 7-10 in.; length of the entire leaves 4-10 in., breadth 2-4 in.; petiole stout, 1:5-5 in. long. Panicles many-branched, ferruginous-

puberulous, shorter than or as long as the leaves. *Petals* pubescent. *Fruit* narrowly ellipsoid, pointed at each end, glabrous, the pericarp thin, length 1:35 in., diam :6 in., damson-colored when ripe. Miq. Flor. Ind. Bat. Suppl. 340; Clarke in Hook. fil. Flor. Br. Ind. II, 726; Hemsley in Hook. Ic. Plantar. t. 1549.

Pahang; Ridley 2439. Selangor; Curtis 2340. Singapore; Ridley; Hullett, 485, 888; King. Pahang; Ridley 2662. Malacca; Griffith (Kew Distrib.) 2702; Maingay 676. Perak; Scortechini; Wray; King's Collector (many numbers), a very common plant. Distrib. Sumatra, Forbes 2207.

The structure of the seed is well explained by Mr. Hemsley in his description and figure in *Hooker's Icones Plantarum*.

# 3. HEPTAPLIURUM, Gærtn.

Large shrubs or trees, glabrous or tomentose, without prickles. Leaves digitate, rarely compound-digitate or 1-foliolate; leaflets coriaceous, entire or remotely toothed or lobed, never closely serrate nor ciliate, those near the panicle usually entire; stipules often connate within the petiole and prominent. Umbels (rarely capitate) panicled or in compound racemes; bracts woolly, deciduous or persistent; pedicels not jointed under the flower; bracteoles few or 0, or rarely densely tufted. Calyx-margin toothed or truncate. Petals 5-6 or many, valvate. Stamens as many as the petals. Ovary cells as many as the petals, disc small or large; styles small, separate or combined in a short conical narrow cylindric column. Fruit subglobose, 5-6-angled. Seeds compressed, albumen uniform. Distrib. Species 55, in the tropics of the Old World.

Leaves simple ... 1. H. avene. Leaves all trifoliolate :-Panicle longer than the leaves, slender; its branches long, spreading, laxly-flowered ... 2. H. luridum. Panicle shorter than the leaves; its branches short, densely-flowered 3. H. triste. Leaves all digitately 5-9-foliolate:-Panicle simple or 2-branched, sub-racemose, only about 3 in. long; the lateral umbels subsessile, lax, few-4. H. sub-racemosum. Panicle divided from the base or near it into several erect narrow branches 6-12 inches long; the lateral branches very short and bearing dense heads of subsessile flowers :-Ovary 8-celled, leaves glaucous and with loose wooly hairs beneath ... 5. H. Cephalotes. Ovary 5-celled :--Both surfaces of the leaves quite glabrous ... 6. H. Scortechinii. Lower surface of leaves tomentose ... ... 7. H. tomentosum. 390

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peduncled umbels of pedicellate flowers:—		177
Ovary 12-celled; leaflets 5, membranous, 7-12 in.		
long	8	H. Singalangense.
Ovary 9-celled; leaflets 7-9, very coriaceous, 3-5		
in. long	9.	H. lati-foliolatum.
Ovary 5-celled:—		
Main nerves of leaflets only 2 or 3 pairs, the basal		
prominent; reticulations rather wide, not promi-		4
nent; panicles very narrow, covered, up to the	1.50	
		H. subulatum.
Main nerves of leaflets 5 or 6 pairs, basal nerves		
prominent; panicles glabrous (rarely hairy) narrow		
	11.	H. venulosum.
Panicle with spreading branches:		
Branches of the panicle umbellate:		
Ovary 5-celled; reticulations of leaves wide, dis-		~ ~
	12.	H. ellipticum.
Ovary 6-celled:—		
Common petiole 1-2.5 in. long; leaflets lanceo-		
late or oblanceolate, caudate-acuminate, much		
narrowed to the base, 15-35 in long; flower-	70	77
buds globular, '1 in. in diam.; fruit '1 in. long Common petiole 2-4 in. long; leaflets ovate-	13.	H. scandens.
lanceolate, shortly caudate-acuminate, the bases		
rounded, 2-4 in. long; flower-bads oblong, about		
	14.	H. affine.
Common petiole 10-24 in. long; leaflets oblong-	14.	n. ajnne.
elliptic, shortly and abruptly acuminate, 4-12 in.		
long; flower-buds sub-globular, 'I in. in diam.;		
The state of the s	15.	H. Hullettii.
Common petiole 5-10 in. long; leaflets oblong-		
elliptic or oblanceolate-oblong, acute, 5-10 in.		
long; flower-buds globular, '15 in. in diam.;		
	16.	H. Ridleyi,
Common petiole 2-2.25 in. long; leaflets lanceo-		
late, acute, narrowed to the base, 1.5-2.5 in. long;		
flower-buds oblong, '2 in. long, fruit '3 in. long	17.	H. nervosum.
		H. Wrayi.
Lower leaves large, digitately decompound :-		
Leaflets entire, narrowly oblong, acuminate, 2-3.5 in.		
	19.	H. biternatum.
Leaflets usually entire, 2.5-7 in. long, panicle 10-15 in.		
long; fruit oblong	20.	H. heterophyllum.
Leaves bipinnate, leaslets coarsely toothed; fruits sub-		
globular	21.	H. Curtisii.
1. Heptapleurum avene, Seem. Rev. Hed. 43		

simple, coriaceous, narrowly oblong, acute, narrowed to the base, the edges slightly recurved; both surfaces glabrous, dull when dry; main nerves about 12 pairs, faint, sub-horizontal; length 3·5-5·25 in., breadth ·9-1·2 in.; petiole ·75-1·25, thickened near the apex. Panicles single or 2 or 3, terminal, puberulous, half as long as the leaves, erect; the few branches rather close together, about ·25 or ·3 in. long, each bearing 3-5 pedicellate flowers; the buds ·15 in., ovoid, their pedicels ·2 in. long; bracts lanceolate, deciduous. Calyx-rim narrow; petals, stamens and stigmas 6. Fruit ellipsoid, as large as a pea, sulcate. Sciadophyllum avene, Herb. Korthals.

SINGAPORE; Ridley 5840, 6337. DISTRIB. Sumatra.

At once distinguished in the genus by its oblong simple leaves.

HEPTAPLEURUM LURIDUM, new species. An epiphytic shrub 2-3 feet long; branches with rugulose glabrous bark. Leaves trifoliolate. with a common petiole 1-1.75 in. long, glabrous, fleshy when fresh, vertically rugose when dry; leaflets very coriaceous, narrowly elliptic-oblong, slightly oblique, tapering gradually to each end; the edges entire. much recurved when dry; both surfaces quite glabrous, the nerves and veins very indistinct even when dry; length 2.5-4 in., breadth .5-.75 in.; petiolules unequal, thick, the lateral 15-25 in. long, the terminal about '4 in. Panicle terminal, longer than the leaves; its branches few, slender, long, spreading, glabrous; the ultimate branchlets 1-1.5 in. long, bearing umbels of 3-8 broadly ovoid glabrous flowers 1 in. long; their pedicels at first only about 'I in. long, but two or three times as long in fruit. Calyx-tube shortly campanulate; its mouth truncate, entire. Petals completely united into a calyptra. Stamens 6, erect, the filaments short. Styles united into a short conical column; the stigmas 6, small, occupying the corners of its truncate apex.

PERAK; Scortechini 1191; King's Collector 8304.

A very distinct small species easily recognised by its narrow very acuminate avenous leaflets borne on fleshy petioles, and by its slender spreading long-branched few-flowered panicles.

3. Heptapleurum triste, new species. A tree; young branches as thick as a swan's-quill, glabrous, pale when dry. Leaves 3-foliolate, the common petiole 1.5-2 in. long; leaflets thickly coriaceous, glabrous, broadly elliptic, blunt or shortly apiculate, the base rounded; the edges entire, boldly recurved when dry; main nerves 10 to 12 pairs, close together, indistinct on both surfaces; length 2.25-3.25 in., breadth 1.5-2 in.; petiolules unequal, the lateral pair 5 in. long, the middle one 8 in. Panicle terminal, shorter than the leaves, glabrous, divided from the base into 2 or 3 spreading branches, ebracteate; the branchlets about 5 in. long (longer in fruit), each ending in an umbel of 10-20 ovate 392

flowers, '15 in. long, their pedicels '1 in. long. Calyx-tube campanulate; the limb truncate, narrow. Petals 5, broadly elliptic, blunt, reflexed. Fruit narrowly oblong, pointed, deeply 5-ridged, glabrous, crowned by the short conical style-column, '2 in. long, glabrous.

PERAK; on Ulu Batang Padong, at an elevation of about 4900 feet: Wray 1509.

A species near *H. ellipticum* but readily distinguished from that in the Herbarium by its dull broad coriaceous leaflets, more widely campanulate calyx-tube, and larger fruit.

4. Heptapleurum sub-racemosum, new species. A shrub 2-3 feet high; young branches with thick corky glabrous bark, pale when dry. Leaves trifoliolate or sometimes 5-foliolate, the common petiole 1.5-2.5 in. long, glabrous. Leaflets coriaceous, narrowly elliptic-lanceolate, caudate-acuminate, narrowed at the base, the edges entire and slightly revolute; both surfaces glabrous, distinctly and finely reticulate when dry; length 2.25-4 in., breadth .75-1.1 in.; petiolules unequal, 3-4 in. long, that of the terminal leaflet .8-1.25 in. long, thickened at the apex. Panicle solitary, terminal, very narrow, sub-racemose, 2-branched, only about 3 inches long and about .65 in. across; the branchlets only .1-2 in. long, each ending in an umbel of 3-5 oblong, green flowers .15 in. long; rim of calyx very narrow. Fruit oblong, .2 in. long, glabrous, with 5 blunt ridges, pale green tipped with bluish, 5-celled.

PERAK; King's Collector 8283.

Readily recognised by its small caudate-acuminate narrow leaflets, much and prominently reticulated when dry; and by its short narrow racemoid panicles.

5. Heptapleurum Cephatotes, Clarke in Flor. Br. Ind. II, 731. A large tree. Leaves digitate, their petioles rather slender, 1.5-3.5 in. long, glaucous; leaflets about 7, oblong-elliptic, the apex abruptly and shortly acuminate, the base rounded, the edges entire and slightly recurved when dry; upper surface shining, glabrous; the lower dull, glaucous, and bearing when young some quickly decidnous loose wooly hairs. Panicle minutely tomentose, terminal, consisting of numerous sub-erect branches 6-12 inches long, bearing shortly peduncled globose ebracteolate dense capitula. Fruit oblong, ribbed, 8-celled, covered with stellate white tomentum and crowned by the broad cluster of short styles; disc large, spongy. H. capitatum, Seem. Rev. Hed. 15 (in part).

MALACCA; Griffith (Kew Distrib.) 2700. SINGAPORE; Ridley 3973, 6409. Penang; Curtis 837. Perak; Wray 1542; Scortechini 391.

6. Heptapleurum Scortechinu, new species. An epiphytic shrub, the young branches stout. Leaves digitate; the common petiole terete, glabrous, stout, 2:5-3:5 feet long; leaflets 8-10, very coriaceous, oblong

or oblong-elliptic, the apex blunt or shortly apiculate, the base rounded, the edges entire and recurved when dry; both surfaces quite glabrous, not reticulate; main nerves 6-9 pairs, slightly prominent on the lower surface; length 9-13 in., breadth 4-6 in.; petiolules unequal, 2.5-5 in. long. Panicle terminal, dividing into several narrow raceme-like branches, 10-20 inches long, covered with pale scurfy tomentum; the branchlets 40 or 50 in number and 35 to 75 in. long, each with a broadly ovate convolute wooly bract at its base, and at its apex a dense globular umbel of sub-globular flowers 1 in. in diam. and borne on pedicels 05 in. long. Calyx truncate, tapering to the base. Petals 6 or 7, narrowly lanceolate. Stigmas free, ovary 5-celled. Fruit unknown.

PERAK; Scortechini 2008.

Collected only by the late Father Scortechin, whose specimens unfortunately are scanty and rather fragmentary. A very distinct species, in general appearance resembling *H. Cephototes*, Clarke and *H. rigidum*, Seem. The leaflets of the latter have however twice as many main lateral nerves, although their length is not greater.

7. HEPTAPLEURUM TOMENTOSUM, Hassk. in Cat. Hort. Bot. Bogor. (1844), p. 165. A half-scandent shrub, 6-8 in. high; the young branches stout, deciduously stellate-pubescent, the older glabrous. Leaves digitate; the common petiole 9-12 in. long, densely covered with rusty stellate tomentum, the intra-petiolar stipules about '75 in. long. Leaflets 5-7, coriaceous, oblong-elliptic, caudate-acuminate, slightly narrowed to the base, the edges entire and slightly revolute; the upper surface boldly bullate and finely reticulate, quite glabrous, pale olivaceous when dry; the lower pale brown, more or less closely covered with pale brown stellate hairs; length 8-10 in., breadth 2.75-3.5 in.; petiolules unequal, 1.5-2.5 in. long, tomentose. Panicles usually two together, terminal, 4-5 in. long, racemose; the lateral branches about 12, short, 2-4 in. long, each bearing a sub-globular umbel of 8-10, ovoid, blunt, glabrous flowers 15 in. long; their pedicels 1 in. long, pubescent. Calva-tube funnelshaped, the rim narrow. Petals 5, white, glabrous, calyptrate. Stamens longer than the petals. Styles 5, conjoined, papilliform, their apices free. Fruit 2 in. long, narrowly oblong, 5-ridged, 5-celled. Sciadophyllum tomentosum, Blume Bijdr. 877; DC. Prod. IV, 260. Paratropia tomentosa, Miq. in Bonplandia for 1856, p. 138; Flor. Ind. Bat. I, Pt. I, 753; Ann. Mus. Lugd. Bat. I, 23.

PERAR; Scortechini, Wray 2202, 3152; King's Collector 2066, 2216, 2569, 7253, 8733. Selangor; Curtis 2341. Distrib. Sumatra; Forbes. 2611.

I have seen no authentically-named specimen of this from the Leiden Herbarium, but the Perak plant agrees so completely with Miquel's description that I have no doubt of the correctness of my identification.

8. Heptapleurum Singalangense, Seem. Rev. Hed. 42. Scandent, glabrous. Leaves digitate; common petiole 12-15 in. long, stout; leaflets 5, membranous, elliptic, shortly acuminate, the base slightly narrowed, the edges with a few irregular remote teeth or entire; both surfaces glabrous, faintly reticulate; main nerves 7 or 8 pairs, curved, spreading; length 7-12 in., breadth 3·25-5·25 in., petiolules 1·25-2·5 in., thickened at the base. Panicle 12-18 in. long, covered with deciduous rusty stellate pubescence, very narrow, (about 2 in. wide); the branches numerous, about 5 in. long, each ending in an umbel of 5-10 oblong obovoid pedicelled flowers '25 in. long, their pedicels '2-3 in. long. Calyx-tube shortly campanulate, minutely scaly; its limb narrow, truncate, undulate. Petals 9, fleshy, narrow, slightly unequal, connate by their edges. Stamens 9. Stigmas united into a notched fleshy ring, ovary 12-celled. Fruit unknown. Paratropia Singalense, Miq. in Ann. Mus. Lugd. Bat. I, 23. Agalma redivivum, Seem. Rev. Hed. 25.

PERAK; Scortechini 390; Curtis 3170.

The specimens which I have seen are few. In foliage they agree with the specimen in Kew named Agalma redivirum, which however Seemann describes as having 7-8-merous flowers. In other respects they agree with Seemann's description of that plant. They also agree with Miquel's full description of his Paratropia Singalangense, except as to the length of the petiole which Miquel gives as only 4-6 inches, a measurement so much out of proportion with those he gives for the petiolules, (1-2.5 in.) and leaflets, that I cannot help suspecting some clerical error.

9. Heptapleurum latifoliolatum, new species. A bush with stout branches. Leaves digitate; the common petiole stout, glabrous, somewhat compressed, 7-11 in. long; leaflets thickly coriaceous, ovaterotund, shortly acuminate or blunt, the base rounded; the edges entire, slightly recurved when dry; both surfaces glabrous, the upper shining, the lower dull and sub-glaucous; main lateral nerves 7 or 8 pairs, spreading, curving upwards, prominent on the lower surface, depressed on the upper when dry; length 3-5 in., breadth 1.75-3.5 in.; petiolules .8-1.5 in., rather stout. Panicles terminal, in pairs, 5-8 in. long, glabrous; the branches short, horizontal, each bearing at its apex an umbel of 10-15 pedicelled flowers; pedicels 3 in. long. Fruit broadly ovoid, deeply 9-ridged, 9-celled, glabrous, crowned by the 9 very short free styles, and .15 in. in diam., red when ripe.

Perak; on Gunong Babu at an elevation of about 5000 feet; Wray 3927.

10. HEPTAPLEURUM SUBULATUM, Seem. Rev. Hed. 42. Scandent, glabrous. Leaves digitate; the common petiole 2-6 in long, slender, glabrous, terete; leaflets coriaceous, oblong-elliptic or elliptic, shortly acuminate, tapering to the base; the edges entire, revolute when dry; both surfaces glabrous and reticulate but not prominently so, the upper

shining, the lower dull when dry; midrib prominent on the lower surface as also the 4 oblique, basal, and 2-3 pairs of sub-horizontal main nerves; length 2.5-7 in., breadth 1-3.5 in; petiolules unequal, 2-2 in., swollen near the apex. Panicle terminal, stellately puberulous, shorter than the leaves while in flower, longer in fruit, bearing many very narrow racemoid branches each with an acuminate lanceolate bract 1 in. long at its base; branchlets very short, from 15 in. when in flower to 5 in. when in fruit, stellately puberulous, each bearing an umbel of 12-20 flowers; buds depressed, globular, glabrous, 05 in. in diam.; their pedicels 2 in. long, slender. Fruit rather broadly ovoid, bluntly 5-ridged, 5-celled, glabrous, 15 in. long. Clarke in Flor. Br. Ind. II, 730. Paratropia subulata, Miq. in Ann. Mus. Lugd. Bat. I, 22.

Malacca; Griffith (Kew Distrib.) 2690; Maingay; 681, (Kew Distrib.) Derry. Pahang; Ridley 1632, 5818. Perak; Scortechini; Wray 872, 3090, 3639; King's Collector 773, 1102, 2343. Distrib. Sumatra.

This closely resembles *H. venulosum*, Seem., and is not always readily distinguishable from that species. The best marks of this appear to me to be the prominence of the basal nerves and the fewness of the other main nerves (only 2 or 3 pairs); and the longer narrower panicles which, up to the pedicels of the flowers, are covered with minute stellate hairs. The majority of the specimens of *H. venulosum*, Seem. have glabrous panicles, but those of var. macrophylla are hairy, and the leaves have many more lateral nerves.

HEPTAPLEURUM VENULOSUM, Seem. Rev. Hed. 44. young branches rather slender, glabrous. Leaves digitate; common petiole slender, terete, glabrous, 4-6 in. long; leaflets thinly coriaceous, oblanceolate-elliptic to oblong-lanceolate, shortly acuminate narrowed to the base, the edges entire; both surfaces shining, glabrous, conspicuously and minutely reticulate; length 3-7 in., breadth 1.25-2.75 in.; petiolules unequal, slender, varying from .5-1.5 in. long in the same leaf, Panicle varying in length but usually shorter than the leaves, terminal, glabrous or occasionally slightly pubescent, (stellate-pubescent in var. macrophylla), dividing into several narrow branches bearing short branchlets each terminating in an umbel of 10-15 depressed-globular flowers I in. in diam.; their pedicels unequal, slender, 15-3 in. in length. Fruit ovoid, bluntly 5-ridged, 5-celled, glabrous, 15 in. long, vellow when ripe. Clarke in Hook. fil. Flor. Br. Ind. II, 729; Brand. For. Flor. 294; Kurz For. Flor. I, 538. Paratropia venulosa, W. & A. Prodr. 377; Wight Ill. t. 118. Hedera venosa, Wall. Cat. 4923. H. terebinthacea, Wall. Cat. 4920, (partly,). Aralia digitata, Roxb. Hort. Beng. 22; Flor. Ind. II, 107.

Andaman Islands; King's Collectors. Malacca; Derry.

This species, so common from the base of the Eastern Himalaya southwards 396

through Assam to Burma, is replaced in the Malayan Peninsula by the closely allied species H. ellipticum, which differs from this as noted under that species. Mr. Clarke, in Flor. Br. India, however, reduces H. ellipticum to H. venulosum, a course in favour of which there is a good deal to be said.

12. HEPTAPLEURUM ELLIPTICUM, Seem. Rev. Hed. 43. Scandent; young branches with pale brown glabrous bark. Leaves digitate; the common petiole 4-6 in. long, glabrous; leaflets 5-7, coriaceous, more or less broadly elliptic, sometimes elliptic-rotund, apiculate, subapiculate or obtuse, the base rounded or sub-cuneate; the edges entire, revolute when dry; both surfaces glabrous and rather dull when dry; main nerves 4 or 5 pairs, the reticulations wide, inconspicuous; length 2.5-7 in., breadth 1.75-4 in.; petiolules uequal, .75-1.5 in., that of the middle leaflet 2 in. Panicle about as long as the leaves, terminal, glabrous, lax, open, the branches long, spreading and bearing fewflowered umbels on long slender peduncles; flowers globular-ovoid, 'l in. long or less, on slender pedicels 15-2 in. long. Fruit oblong, yellowish, with 5 ridges and 5 cells. Paratropia elliptica, Miq. in Bonplandia 1856, p. 138; Flor. Ind. Bat. I, Pt. I, p. 756; in Ann. Mus. Lugd. Bat. I, 20; Sciadophyllum ellipticum, Blume Bijdr. 878; DC. Prodr. IV, 260.

SINGAPORE; Ridley 5839, 6399. MALACCA; Derry 1187, 1215. PENANG; Ourtis 972. PERAK; Scortechini; Wray 2020, 2136; King's Collector 2541, 4733, 10375, 10534. ANDAMAN AND NICOBAR ISLANDS; King's Collector.

This resembles H. venulosum, Seem, but the reticulations on the leaves of this are wider and less distinct than in that; and the panicles of this have spreading, quite glabrous, lax branches.

13. HEPTAPLEURUM SCANDENS, Seem. Rev. Hed. 43. A slender creeper 3-5 in. long, the stem pale and corky. Leaves small, digitate; common petiole 1-2.5 in long, slender; leaflets 3-5, thinly coriaceous, lanceolate, caudate-acuminate, tapering much to the base, the edges entire and somewhat recurved; both surfaces glabrous, the upper smooth and shining, the lower dull and reticulate; length 1.5-3.5 in., breadth .5-8 in.; petiolules subequal, .2-25 in. long. Panicles longer than the leaves, slender, 4-8 in. long; the branches spreading horizontally, simple, each ending in an umbel of flowers on a slender pedicel nearly .75 in. long; buds globular, .1 in. in diam. Fruit elliptic, boldly 5-ridged, 5-celled, .1 in. long. Paratropia scandens, Miq. in Bonplandia 1856, p. 138; Flor. Ind. Bat. I, Pt. I. 757. P. brachybotrya, Miq. Flor. Ind. Bat. I, Pt. I, 755. Sciadophyllum scandens, Blume Bijdr. 878.

PERAK; Wray 1844, 2401, 2880; Curtis 2687; Scortechini 218, 1352; King's Collector 4304. DISTRIB. Java, Sumatra.

A very slender glabrous species, at once distinguished by its small lanceolate, caudate-acuminate, digitate leaflets.

14. Heptapleurum affire, new species. A shrub 6-8 feet high, semi-scandent; young branches as thick as a goose-quill, shining, glabrous; common petiole 2-4 in. long, slender, the stipule bout 65 in., both glabrous; leaflets 5 or 6, thinly coriaceous, ovate-lanceolate to elliptic, acuminate, the base sometimes narrowed but always rounded, the edges entire; length 2·25-4 in., breadth 1·25-1·75 in.; petiolules somewhat unequal, 75-1·5 in. long. Panicle terminal, when young furfuraceously puberulous towards the base, ultimately quite glabrous everywhere, 2·5-5 in. long and almost as broad; the main branches 3 or 4, spreading and bearing, in pairs or whorls of 3, six to twelve ultimate ebracteate branches 5-75 in. long, each terminating in an umbel of 7-10 pedicellate broadly ovate flowers nearly 2 in. long, the pedicels 2 in. long. Fruit broadly ovate, apiculate, boldly 6-ridged, 6-celled, glabrous, nearly 25 in. long.

Perak; at elevations of from 3000 to 5000 feet. Scortechini 333, 486; King's Collector 3827; Wray 4121.

This in many respects resembles H. ellipticum, but has larger flowers and its fruit is on shorter pedicels.

15. Heptapleurum Hullettii, new species. A small tree, 10-15 feet high; branches stout, rugulose, deciduously pubescent. Leaves large, digitate; the common petiole terete, glabrous, 10-24 in. long; leaflets 7-11, coriaceous, oblong or oblong-elliptic, occasionally somewhat broader in the upper than in the lower half, shortly and abruptly acuminate, slightly narrowed to the rounded base; both surfaces glabrous, not reticulate, the midrib prominent; main nerves 5-8 pairs, distant, slightly curved and ascending, prominent on the lower surface when dry, obsolete on the upper; length 4-12 in., breadth 1.5-3.25 in.; petiolnles 1.25-3.5 in., slender, glabrous. Panicles 9-12 inches long, terminal, several together, long and narrow, with short horizontal slender branches from 5 to 1 in. long, bearing terminal umbels of 8-12 small 6-merous sub-globular flowers 1 in. in diam. Fruit elliptic, 6-ridged, 6-celled, crowned by the 6 short distinct styles, glabrous, pedicels 25-3 in. long.

Singapore; Ridley 447, 4591, 6012; Wray 2323; King's Collector 3048. Johore; King and Hullett.

A species resembling *H. dvaricata*, Miq.; but having leaflets with fewer nerves and no reticulations, much longer panicles and narrower fruit. It is allied also to *H. longifolium*, Seem, but the leaflets of that species have greatly more numerous main nerves, and the panicles are densely clothed with broad scale-like hairs and have longer lateral branchlets.

16. HEPTARLEURUM BIDLEYI, new species. Scandent; young branches stout, glabrous. Leaves digitate; common petiole terete, glabrous, 5-10 in. long; leaflets 5, very coriaceous, oblong, oblong-elliptic or oblanceolate oblong, acute, slightly narrowed at the base; the edges

entire, very slightly revolute when dry; both surfaces glabrous, the reticulations faint when dry; main nerves very slightly prominent on the lower surface, about 8 pairs, spreading, the intermediate nerves almost as conspicuous; length 4-6.5 in., breadth 2-2.75 in.; petiolules unequal, 75-2.25 in. Panicle terminal, glabrous, 5 or 6 in. long, with several spreading branches; the branchlets few, about 5 in. long, each bearing an umbel of 10-20 globular flowers 15 in. in diam. Calyxtube short, widely campanulate, the limb narrowed and truncate. Petals 5, elliptic, glabrous. Fruit ovoid, somewhat succulent, smooth, faintly 6-ridged, 25 in. long, 6-celled.

SINGAPORE; Ridley 6336 and perhaps also 1890a.

17. Heptapleurum nervosum, new species. A small shrub; branches with glabrous bark pale brown when dry. Leaves digitate; the common petiole terete, 2-2.25 in. long; leaflets 6, very coriaceous, lanceolate, acute, the base narrowed; the edges entire, much recurved when dry; both surfaces glabrous, the upper shining, the lower dull; main nerves 7-10 pairs, straight, sub-horizontal, very prominent on the lower surface and deeply impressed on the upper when dry, length 1.5-2.5 in., breadth .5-9 in.; petiolules unequal, the middle two about .75 in. long, the others about half as long. Panicle terminal, from 1.5-2 in. long, rusty-puberulous at first, afterwards glabrous, branches about 2, spreading, with short bracteoles at the base and above it, each ending in an umbel of 8-10 oblong pedicelled glabrous flowers 2 in. long, their pedicels .1-15 in. long. Calyx-tube cylindric-campanulate, the limb truncate and entire. Petals narrowly triangular. Frust rotund-ovoid, boldly 6-ridged, 6-celled, glabrous, 3 in. long.

PERAK, on Gunong Chabong; Scortechini.

A very distinct small species with rather large flowers and fruit for the genus, and prominently-nerved very coriaceous leaflets.

18. Heptapleurum Wratt, new species. A small tree; young branches as thick as a swan's quill, furfuraceous. Leaves digitate; common petiole 6-9 in. long, slender, glabrous; leaflets 7-9, thinly coriaceous, elliptic, abruptly shortly and sharply acuminate, the base rounded, the edges with shallow distant sharp serrations; upper surface glabrous, the lower glaucous and with scattered minute stellate hairy scales; main nerves 7 or 9 pairs, prominent beneath, length 3-5 in., breadth 1.75-2.25 in.; petiolules unequal, 1.5-2.5 in. long. Panicle terminal, longer than the leaves, furfuraceous stellate-pubescent, bearing a few rather distant, horizontal or deflexed many-flowered racemes. Flowers 15 in. in diam., their pedicels 2 in. long. Calyx-tube funnelshaped, its mouth with 5 short triangular spreading teeth. Petals 5, elliptic-oblong, glabrous, reflexed. Fruit globular, prominently 5-ridged,

crowned by the long confuent column of styles, glabrous, 5-celled, 15 in in diam.

PERAK; on Gunong Brumber Pahang, at an elevation of about 7000 feet, Wray 1585.

· A very distinct species, at once distinguishable by its racemose panicles, and leaflets glaucous on the lower surface and with serrate edges.

19. Heptapleurum biternatum, Clarke in Hook. fil. Flor. Br. Ind. II, 735. A shrub several feet high; the young shoots and the under surfaces of the leaves deciduously stellate-pubescent. Leaves digitately decompound or twice pinnate, with ternate leaflets at each node of the rachis; leaflets coriaceous, narrowly-oblong, acuminate, entire, the base slightly narrowed and rounded; length 2-3.5 in., breadth .5-.75 in., petiolules 1 in. long or less, that of the terminal leaflet .4 in.; both surfaces minutely reticulate and shining, the upper glabrous, the lower with deciduous stellate pubescence. Panicle 8 in. long, but only about 1.5 in. across; the branches little-divided, stellate-hairy; bracts deciduous, pedicels .2 in. long.

MALACCA; Maingay (Kew Distrib.) 684.

Known only by Maingay's fragmentary specimens.

20. HEPTAPLEURUM HETEROPHYLLUM, Seem. Rev. Hed. 40. A bush or small tree 8-12 feet high. Lower leaves large, ternately decompound. 24 in. across; common petiole 12-24 in. long; the upper leaves smaller and only twice digitate; the leaflets in all 3 to 5 on each petiolule, thinly coriaceous, variable in shape, oblong-lanceolate to elliptic or broadly ovate, shortly acuminate, narrowed or rounded at the base; the edges entire, rarely with 1 or 2 teeth near the apex; both surfaces minutely reticulate and glabrous, the lower minutely dotted; length 2.5-7 or even 9 in., breadth 1-2:25 in.; petiolules of the lower leaflets :1-25 in., that of the terminal twice as long. Panicles with deciduous pale stellate pubescence, solitary or several together, 10-15 in. long, and only 1.5-2 in. across; the branches horizontal, slender, each ending in an umbel of flowers on slender pedicels, the flowers bearing fertile pistils smaller than those with fertile stamens. Fruit narrowly oblong, boldly 5-ribbed, glabrous, 5-celled, nearly 25 in. long, claret-coloured when ripe. Clarke in Hook, fil. Flor. Br. Ind. II, 731. Hedera heterophylla, Wall. Cat. 4919; G. Don. Gen. Syst. III, 394. Paratropia heterophylla, Presl Epimel. Bot. 250; Miq. Flor. Ind. Bat. I, Pt. I, 761.

Penanc; Wallich, Curtis 241, 2301 and possibly 1950. Peranc; Scortechini 145, 664; King's Collector 718, 2688, 8640, 8769.

21. HEFTAPLEURUM CURTISII, new species. A large shrub. Lower leaves bipinnate, the upper trifoliolate; common petioles of both about 8 in long; leaflets thinly coriaceous, oblong-elliptic, sometimes slightly

obovate, the apex shortly acuminate, the edges entire in the lower half but with a few unequal scanty coarse sharp teeth in the upper half; the base slightly narrowed, sometimes oblique; both surfaces quite glabrous, shining and finely reticulate when dry; length 3-6 in., breadth 1·5-2·5 in.; petiolules unequal, the lateral '1 in. long or absent, the terminal '35-8 in. Panicle terminal, shorter than the leaf-petioles, with several rusty stellate-tomentose bracts '75 in. long at its base, 2-branched; the branches narrow, sparsely covered with scurfy pubescence; the lateral branchlets about '75 in. long, slender, each bearing at its apex a crowded umbel of from 10-20 oblong flowers on pedicels '15-3 in. long. Fruit oblong, boldly 5-ribbed, crowned by the conical disc bearing 5 small rounded stigmas at its corners, 5-celled.

PENANG; at Pulo Boetong, 1950.

I have seen only two specimens (and they are both of the same gathering) of this very distinct species.

### 4. TREVESIA, Vis.

Shrubs or small trees, prickly or unarmed, glabrous or stellate-hairy. Leaves palmifid or palmisect; petioles often united by a wing at their base; stipules united within the petiole, or obsolete. Flowers polygamous, large for the Order; umbels panicled; pedicels not jointed under the flower; bracts small or 0. Calyx-margin entire or toothed. Petals 8-12, valvate, somewhat thick, often cohering as a cap in the fertile flowers. Stamens equal in number to the petals. Ovary with as many cells as the petals; styles connate into a short column. Fruit ovoid, large for the Order. Seeds compressed; albumen uniform. Distrib. Species about 10; natives of Eastern India, Malaya and Polynesia.

TREVESIA PALMATA, Vis. in Mem. Acad. Torino, Ser. 2, IV, 262, with fig. A small single-stemmed tree 10-25 feet high; young shoots ferruginous-pubescent and very prickly. Leaves coriaceous, large (12-24 in. in diam.), rotund in general outline, deeply palmatifid; or, in young shoots, palmatisect, widely cordate at the base, the lobes acuminate, their edges serrate or sometimes lobulate; glabrous when adult or with a few small rufous stellate hairs on the lower surface; the lobules contracted in the middle to a pseudo-petiolnle (in var. cheirantha); petiole often prickly, 6 to 20 in. long. Panicles 12-30 in. long, the branches spreading, when young clothed with reddish-brown tomentum; bracts oblong, 1 in. long, usually deciduous; pedicels 1-1.5 in. long. Flower-buds 12 in. in diam. Fruit ovoid-rotund, the ribs not prominent, crowned by the stout style, fleshy, 5 in. in diam. Seem. Rev. Hed 77; Kurz For. Flora Burma, I, 539; Clarke in Flor. Br. Ind. II, 732; Bærlage in Ann.

Jard. Bot. Buitenzorg VI, 108. Gastonia palmata, Roxb. Hort. Beng. 33; Flor. Ind. II, 407; Lindl. in Bot. Reg. t. 894. Gilibertia palmata, DC. Prodr. IV, 256. Hedera ferruginea and H. palmata, Wall. Cat. 4909 and 4910 (partly). Brassaiopsis confluens, Seem. Rev. Hed. 18 (as to the leaves). Aralia dubia, Spreng. Syst. Veg. IV, 2, p. 125.

PERAK; Scortechini; King's Collector 44:15, 6715.

Var. cheirantha, Clarke in Flor. Br. Ind. II, 732; laminæ of the lobes cut away in the middle so as to expose the midrib and form a pseudo-petiolule. *Hedera? cheirantha*, Jack in Wall. Cat. 4925; Wall. Cat. 4910 in part.

PERAK; Wray 2322; King's Collector 2308; Scortechini 344.

### 5. DENDROPANAX, Decne and Planch.

Unarmed glabrous trees or shrubs. Leaves simple, entire, (palmately 3-5-lobed on young shoots). Umbels solitary or in small panicles; bracts small or none; pedicels not jointed under the flower. Limb of the calyx entire or 5-toothed. Petals 5, free, valvate, rather thick. Stamens 5. Styles united into a column at the base, free at the apex. Fruit globose or ellipsoid, succulent, distinctly or obscurely 5-ribbed. Seeds compressed; albumen uniform. Distrik about 12 species mostly tropical American; one Japanese; one Indo-Chinese.

Dendropanax Maingari, new species. A shrub; young branches with corky bark, pale-brown when dry, all parts except the umbels glabrous. Leaves alternate or sub-opposite, thinly coriaceous, oblong-ovate, oblong or lanceolate, acute; the base rounded, sometimes slightly narrowed; the edges entire and slightly recurved when dry; both surfaces glabrous, dull, the midrib prominent on the lower and sending off near its base two bold curving nerves running at some distance from the margin to the apex and, above the origin of these, 7–8 pairs of faint horizontal nerves; length 2–3·25 in., breadth 1–1·75 in., petioles varying from 25–1·5 in. in length. Umbel simple, terminal, its pedicel 35–5 in. long; flowers 8–12, oblong, pedicelled, 2 in. long, their pedicels 25–4 in. long. Calyx cylindric-campanulate, puberulous, its mouth with 5 sharp triangular teeth. Petals broadly lanceolate, acute, quite free. Fruit globular, succulent, glabrous, 3 in. in diam. D. parviflorum, Clarke in Hook. fil. Flor. Br. Ind. (not of Bentham).

Malacca; Maingay (Kew Distrib.) 682; Griffith 2685-1. Perak; Scortechini 308.

This Dendropanax, found in Malacca and Perak, does not agree with specimens of D. parviforum, Benth., collected in Hongkong. It appears to me to be a distinct species hitherto un-named.

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### 6. ARTHROPHYLLUM, Blume.

Shrubs or small trees, unarmed. Leaves glabrous or sub-glabrous, the lower large and compoundly pinnate, the uppermost opposite and simple, the intermediate 3-foliolate; leaflets easily separable from the rachis; stipules forming a ligule within the petiole. Inflorescence a terminal compound umbel, the terminal umbellules peduncled; bracts very small; pedicel not jointed under the flower. Calyx-teeth 5, small. Petals 5, valvate. Stamens 5. Ovary 1-celled, 1-ovuled; style short, simple. Fruit (in the Indian species) ovoid, not angular. Seed sub-globose; albumen ruminate. Distrib. Species 3, Malayan.

The 1-celled ovary is anomalous in this Order, and this genus was excluded from Araliaciw by Seemann.

Lower leaves pinnately decompound ... 1. A. diversifolium.

Lower leaves simply pinnate, or at most bipinnate .. 2. A. pinnatum.

1. ARTHROPHYLLUM DIVERSIFOLIUM, Blume Bijdr. 879. A shrub or small tree, all parts except the umbels glabrous. Lower leaves large, pinnately decompound, with pairs of opposite leaflets at the main divisions, the upper leaves smaller and simply pinnate, and the uppermost of all trifoliolate or simple; leaflets coriaceous, oblong or elliptic, acute, narrowed at the base, entire; length 1:5-3 in., breadth 1:25-2:25 in.; petiolules 25-45 in., slender. Inflorescence a compound umbel; the pedancles of the ultimate umbels unequal, covered with warm brown deciduous stellate tomentum; lengthening in fruit to '5-1'5 in.; pedicels 25 in. long; fruit ovoid-globose, not ridged, crowned by the conical disc, glabrous. Clarke in Hook. fil. Flor. Br. Ind. II, 734; Mig. Flor. Ind. Bat. I, Pt. I, 767. A. javanicum, Blume Bijdr. 879; DC. Prodr. IV, 266; Kurz For. Flor. I, 540. A. ellipticum, Blume and DC. l.c. A. Blumeanum, Zoll. & Mor. Verz. 41; Miq. l. c. 1, 768. A. ovalifolium, Jungh. & De Vriese in Miq. l. c. t. 14. Panax polycarpum, Wall. Cat. 4930. P. Jackianum, Wall. Cat. 4931. Hedera Jackiana, G. Don Gen. Syst. III, 394. H.? ovata, Wall. Cat. 4911. Eupteron, sp. nov. Kurz Andam. Rep. Suppl. B 9.

MALACCA; Griffith (Kew Distrib. 2675). SINGAPORE; Anderson 48, 185; Hullett 351, 393; Ridley, 5838. Penang; Curtis 781. Perak; Wray 2012, 3063; King's Collector and Scortechini, many numbers. Andaman Islands; Kurz.

2. ARTHROPHYLLUM PINNATUM, Clarke in Hook. fil. Flor. Br. Ind. II, 734. A bush; all parts glabrous. Leaves pinnate, rarely bipinnate or simple; the pinnate ones 12-18 in. long and with 5-17 leaffets; leaflets varying in size, coriaceous, lanceolate, caudate-acuminate, tapering to the base; the edges entire, glabrous; length 1.25-4 in., breadth 4-1 in., petiolule absent or only 1 in. in length. Umbels with few:

umbellules, their peduncles 1.5-2 in. long; pedicels glabrous or with rusty stellate decidnous pubescence; fruit sub-globose, shining, 15 in in diam. Panux pinnatum, Lamk. Dict. II, 715; DC. Prodr. IV, 254; Wall. Cat. 9057. P. secunda, Schultz Syst. VI, 215. Nothopanax? pinnatum, Miq. Flor. Ind. Bat. I, Pt. I, 766.

Penang; Wallich, Maingay (Kew Distrib.) 679. Malacca; Maingay 677; Grifith (Kew Distrib.) 2676; Ridley 3224. Pebak; Wray

330, 1475; Scortechini 352.

### 7. WARDENIA, new genus.

A miniature tree with prickly stem, otherwise unarmed. Leaves coriaceous, simple, on long terete petioles expanded at the base into a short sheath with 2 minute stipules on its inner surface. Inflorescence a terminal shortly-branched compound umbel. Flowers hermaphrodite. Calyx-tube narrowly campanulate, its limb with 5, small, spreading teeth. Petals 5, calvptrate, their edges slightly infolded, valvate below, slightly imbricate near the apex; the midribs prominent on the inner surface. Stamens 5, alternate with the petals; the filaments short, straight; the anthers versatile; the cells linear, quite separate from each other, each united by its middle to the tip of the filament. Disc large, fleshy, convex, covering the whole of the apex of the ovary, slightly 5-lobed. Styles united to form a short thick column without any distinct stigmatic enlargement; ovary 1celled, with 2 parallel pendulous ovules. Fruit 2-celled, by the formation of a dissepiment not present in the ovary, 2-seeded; seeds compressed. A single species.

This genus is allied to Arthrophyllum; but its ovaries, although one-celled, have two pendulous ovules. The fruit, however, is two-celled, by the subsequent formation of a dissepiment, and is 2-seeded. The leaves moreover are all simple. The seeds of the few specimens which I have seen are quite young and the nature of the albumen cannot be made out. I have named the genus in honour of my friend Brigade-Surgeon Lt.-Colonel C. J. H. Warden, a distinguished pharmacologist and one of the authors of the Pharmacographia Indica.

Wardenia simplex, King. A shrub 6-8 in. high, deciduously rufous-pubescent towards the apex, prickly near the base. Leaves simple, elliptic, tapering gradually to the shortly acuminate apex, not narrowed to the slightly cordate base; both surfaces bearing minute scattered rusty stellate hairs; length 8-15 in., breadth 3.5-7 in., petiole 5-10 in. Flower buds 1 in. in diam., conical; pedicels 6-9 in. long, slender, rusty-pubescent, the umbels 10-20-flowered. Calyx slightly rusty-pubescent. Petals glabrous. Fruit elliptic-globose, subglabrous, 2 in. long, crowned by the calyx and by the slender conic stylar column.

PERAK; near Ulu Kerling, King's Collector in flower during March; only once collected.

### 8. HETEROPANAX, Seem.

A small unarmed tree. Leaves glabrous or nearly so, very large, pinnately decompound, stipules not prominent. Panicles large, the branches bearing umbels, stellate-hairy; bracts of umbels small, ovate, obtuse, persistent; pedicels not jointed to the flowers. Flowers polygamous, the female flowers most numerous in the terminal umbel. Calyxlimb minutely toothed. Petals 5, valvate. Stamens 5, filaments filiform, anthers ovate. Disk nearly flat; ovary 2-celled; styles 2, slender, free from the base, spreading, the stigmas sub-terminal. Fruit laterally compressed, coriaceous, almost didymous, 2-seeded. Seeds compressed, albumen ruminate. Species 1 or 2; Indo-Chinese.

HETEROPANAX FRAGRANS, Seem. Rev. Hed. 73. A tree 40-60 feet high; all parts glabrous. Leaves large, the lower often 3 feet across, pinnately decompound, the pinnae with a pair of opposite leaflets at their forks; leaflets ovate or ovate-oblong, acute or acuminate; the base slightly oblique, not narrowed; variable in size (2.5-5 in. long, and 1.5-2.5 in. broad); petiolules of lateral leaflets 1-2 in. long, that of the terminal one 18-1 in. Panicles terminal, longer than the leaves; flowers small, whitish-tomentose, in small condensed umbels, their pedicels under 25 in. long; fruit compressed, sub-reniform, subglabrous, slightly glaucous, 35 in. across. Brandis For. Flora 249; Kurz For. Flora Burma, I, 541; Clarke in Hook. fil. Flor. Br. Ind. II, 734. Panax fragrans, Roxb. Hort. Beng. 21; Flor. Ind. II, 76; Wall. Cat. 4929; DC. Prodr. IV, 254 (excl. syn. of Don).

Andaman Islands; King's Collector. Distrib. Brit. India, Java, China.

# 9. Brassatopsis, Decne. & Planch.

Large shrubs or trees, glabrous or tomentose, armed or not. Leaves digitate or palmate or angled; stipules connate within the petiole, not prominent. Umbels in large compound panicles, young parts at least stellately tomentose; bracts not large, often persistent; pedicels rising from a dense cluster of persistent bracteoles, not jointed under the often polygamous flowers. Calyx 5-toothed. Petals 5, valvate. Stamens 5. Ovary 2-celled; styles 2, united, long or short. Fruit broadly globose or turbinate, 2- or (by abortion) 1-seeded. Seed not compressed; albumen ruminated. Distrib. Species 11; Northern Brit. India to Java.

BRASSAIOPSIS PALMATA, Kurz in Journ. As. Soc. Beng. XXXIX,

(1870) Pt. II. 77. A small sparingly prickly tree with simple stem slightly branched near the top; young shoots covered with tawny or rusty scurfy tomentum. Leaves crowded at the ends of the stem and branches, large, 9-15 in. across, coriaceous, rotund in general outline, cordate at the base, palmately lobed about half or more than half way down; the lobes 5-9, oblong, or sometimes sinuate towards the base, acuminate, serrate; upper surface glabrous, lower sub-glabrous; the petiole 10-20 in, long, without prickles, scurfy-tomentose when young, ultimately glabrous. Inflorescence rusty-tomentose, terminal, panicled, the ultimate branches bearing many-flowered bracteolate umbels; flowers '15 in. across, their pedicels 5-7 in. long; rim of calvx narrow, irregularly toothed. Fruit broadly elliptic or turbinate, terete, 3 in. long, as large as a pea, crowned by the slender column of connate styles; cocci 1 or 2, with chartaceous pericarp, 1-seeded. Kurz For. Flor. Burma I, 537; Clarke in Hook. fil. Flor. Br. Ind. II, 735. Panax palmatum, Roxb. Hort. Beng. 21; Flor. Ind. II, 74. Hedera polycantha, Wall. Pl. As. Rar. II, t. 190; Cat. 4907 B.

This species is closely allied to B. Hainla, Seem., from which it differs chiefly in having leaves with deeper narrower more serrate lobes, and also in having rusty instead of pale tomentum on the young shoots and inflorescence. The two are in my opinion rather too closely allied to be kept distinct as species. In his distribution, Wallich issued both under the name Hedera polycantha and the number 4907.

PERAK; Scortechini 17, 146; Ridley 3018; King's Collector 2598. Distrib. Brit. India, along the base of the Himalaya; Assam and Burma.

VAR. andamanica, lobes of leaves obovate-oblong, the edges almost entire; inflorescence a narrow panicle nearly as long as the leaves. Araliopsis andamanica, Kurz in Andaman Report, App. B, 9.

Andaman Islands; Kurz, King's Collectors.

# 10. HEDEROPSIS, C. B. Clarke.

A glabrous unarmed tree. Leaves 1-3-foliolate; leaflets lanceolate, denticulate or nearly entire; base of petiole much dilated; stipules inconspicuous. Umbels panicled; bracts and bracteoles deciduous; pedicels jointed close under the flowers. Calyx margined, somewhat prominently 5-toothed. Petals 5, valvate. Stamens 5. Ovary 5-celled; styles connate. Fruit berried, large, sub-globose, crowned by the stout persistent style. Seeds 5-4; albumen ruminated.

HEDEROPSIS MAINGAVI, Clarke in Hook. fil. Flor. Br. India, II, 739. Leaflets of the compound leaves membranous, ovate-lanceolate, acuminate, narrowed at the base, nerves faint, length 3-5 in., breadth 1.5-2

in., petiolules '1-2 in. Simple leaves as long as 8.5 in. and about 4 in. broad; petiole 1-2 inches. Inflorescence a panicle of umbels with puberulous peduncles 1 in. or more long. Calyx-tube sub-globular, puberulous. Petals ovate-lanceolate, spreading, '15 in. long. Fruit (unripe) more than '5 in. long, including the conical disc and persistent style.

MALACCA; Maingay (Kew Distrib.) 683.

This plant has not been collected since Maingay's time, and it is known only from his fragmentary specimens.

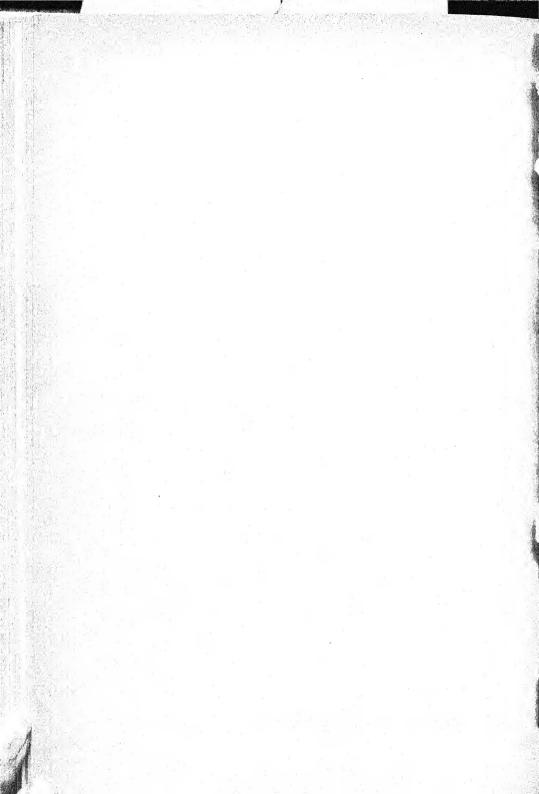
## 11. Tupidanthus, H. f. & T.

A large glabrous shrub, at first erect but afterwards a lofty climber. Leaves digitate; leaflets glabrous, leathery, entire; stipules connate within the petiole. Inflorescence a compound umbel or small panicle; pedicels thick, not jointed under the flowers. Calyx-margin obsolete. Petals closely connate, falling off in a cap. Stamens very many, in two or several series. Ovarian cells and stigmas very numerous; the latter sessile, radiating, crowded but not connate. Fruit globose, depressed, succulent.

TUPIDANTHUS CALYPTRATUS, Hook. fil. and Thoms. in Bot. Mag. t. 4908. Leaflets 7-9, oblong or oblong-obovate, acute or blunt, 4-7 in. long, and 1.75-3.5 in. broad, the petiolules 1-2 in.; the common petiole 6-15 in. Inflorescence umbellate, 3-4-branched; the branches stout, short and with large coriaceous bracts at their bases; the ultimate umbels with 3-7 pedicellate flowers nearly 1 in. across; calyxtube glabrous, thickly coriaceous. Stamens 50-70, crowded. Fruit sub-globose, succulent, 1.25-1.5 in. in diam. when ripe. Seem. Rev. Hed. 6; Clarke in Hook. fil. Flor.Br. Ind. II, 740.

PERAK; on Gunong Ulu Sungei, elevat. 4500 feet; Wray 1594. DISTRIB. Burma; Khasia Hills and probably Java.

Mr. Wray's specimens were collected at an elevation much higher than this species ever ascends to in British India. They have smaller leaves with blunt leaflets, but are otherwise indistinguishable from the British Indian plant.



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# MATERIALS

FOR A

# FLORA OF THE MALAYAN PENINSULA.

BY

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LATE SUPERINTENDENT OF THE ROYAL BOTANIC GARDEN, CALCUTTA.

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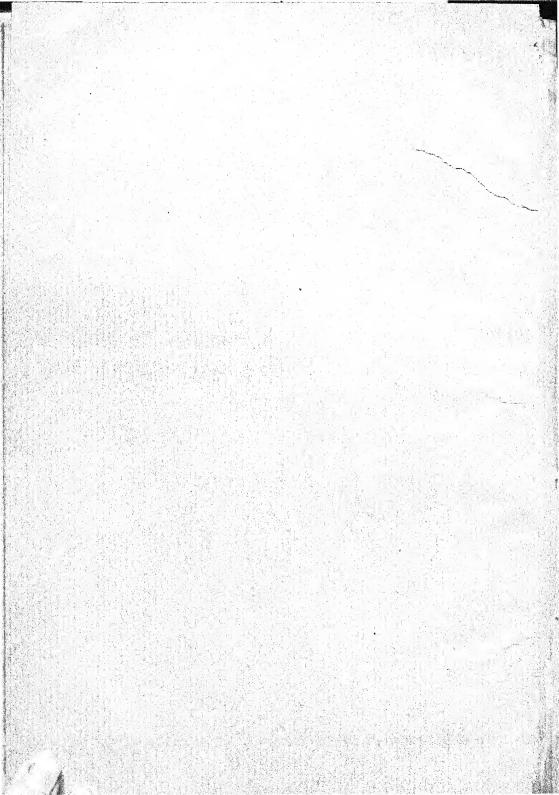
No. 11.

CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS.

**1900**.

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# MATERIALS

FOR A

# FLORA OF THE MALAYAN PENINSULA.

ву

SIR GEORGE KING, K.C.I.E., M.B., LL.D., F.R.S.,

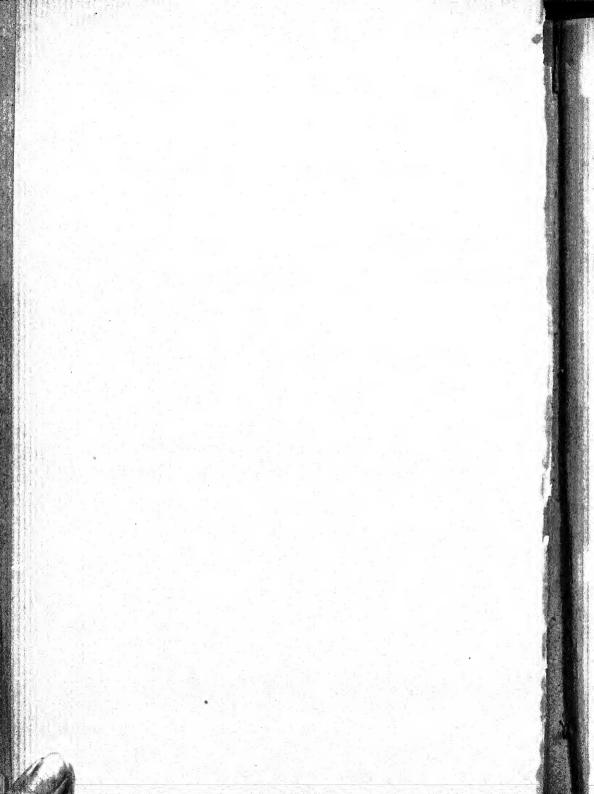
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From the Journal, Asiatic Society of Bengal, Vol. LXIX. Part II, No. 1, 1900.

I.—Materials for a Flora of the Malayan Peninsula.—By SIR GEORGE KING, K.C.I.E., M.B., LL.D., F.R.S., &c., late Superintendent of the Royal Botanic Garden, Calcutta.

### No. 11.

After about two years of unavoidable delay, I am now able to offer to the Society a further contribution towards the completion of these Materials. The paper now submitted gives an account of the natural order which, in the sequence hitherto followed, falls to be numbered XLVII. An account of the family Myrtacew which ought, according to that sequence, to have immediately preceded this one of Melastomacew is now in preparation, and will I hope before long be ready for presentation to the Society. The present paper is not entirely my own work, the account of the genus Sonerila having been most kindly prepared for me by Dr. O. Stapf, First Assistant in the Royal Herbarium, Kew, whose contributions to the Botany of Borneo, published by the Linnean Society of London, have already marked him as an authority on the Malayan Flora.

### Order XLVII. MELASTOMACEÆ.

Herbs or shrubs, more rarely trees or climbers. Leaves opposite or rarely whorled, generally petioled, entire or nearly so, often palmately 3-5-7-nerved from near the base to the apex (mostly pinnate-veined in Memecylon); stipules 0. Flowers spiked, panicled or cymose,

rarely solitary or fascicled, regular, hermaphrodite. Calyx-tube united by vertical walls to the ovary, rarely nearly free; limb usually 4-5-(sometimes 3- or 6-)lobed, or truncate, rarely falling off in a cap. Petals as many as the calyx-lobes, contorted in bud, inserted on the margin of the calyx-limb. Stamens as many as or more than (frequently twice as many as) the petals, inserted with them; alternate stamens often shorter, sometimes rudimentary, filaments bent inwards in the bud; anthers opening at the summit by one or two pores, rarely by slits down the face; connective often appendaged near the base by bristles. tubercles or a spur. Ovary 4-5- (rarely 3- or 6-)celled (in Memecylon 1-celled); style simple, filiform, rarely short; ovules very many (except in Memecylon); placentas axile, parietal or free central. Fruit included in the calvx-tube, capsular or berried, breaking up irregularly or by slits through the top of its cells. Seeds minute, very many (in Memecylon one only); albumen 0; cotyledons short (or in some of the Memecyleæ long, thin and convolute) .- DISTRIB. Species about 2700, tropical, with a few subtropical; mostly in America, but many in southeast Asia, and a few in Africa and Polynesia.

Suborder I. Melastomer. Ovary 3-6-celled. Ovules very many, on placentas radiating from the axis. Seeds very many. Anthers opening by a single terminal pore (rarely by 2).

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Tribe I. Osbeckiez. Seeds curved through half a circle, minutely punctate. Stamens all nearly alike. Fruit a berry ... 1. Otanthera. Stamens very unequal ... 2. Melastoma.
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Tribe II. Oxyspores. Seeds straight, oblong or cuneate, raphe often excurrent. Ovary with the vertex usually free, conical. Petals more than 3. Inflorescence not scorpioid. Fruit capsular.

\* Inflorescence terminal (see also Ochthocharis).

" Inglorescence terminat (see also Ochanocharis).			
Panicles broad, often coloured	•••	3. Oxyspora.	
Panieles narrow. Flowers minute		4. ALLOMORPH	IA.
** Inflorescence axillary, stamens equal, flowers min	nute.		
Stamens 4	***	5. Blastus.	
Stamens 10		6. Оситносна	RIS.
Stamens 8	•••	7. ANERINCLEI	STUS.
Tribe III. Sonerilem. Seeds straight, oblong of	or cune	ate, often ang	gular,

Tribe 111. Soveriles. Seeds straight, oblong or cuneate, often angular, raphe sometimes excurrent. Ovary flattened or depressed at the vertex. Fruit capsular.

Petals 3. Inflorescence scorpioid ... 8. Sonerila.

Petals 4. Flowers in a long-peduncled head ... 9. Phyllagan

Petals 4. Flowers in a long-peduncled head ... 9. Phyllagathis.

Tribe IV. Medinillee. Seeds straight, cuneate or obovate, often angular.

Connective often appendaged near the base. Fruit baccate.

\* Longer stamens having two long bristles attached to the base of the connective in front.

Cymes lateral	 ***	 •••	10.	MARUMIA.
Panicles terminal	 	 	11.	DISSOCHÆTA.
4.10				

\*\* Longer stamens having the connective at base variously appendaged but not with two long bristles in front (equal and with two short bristles in one species.)

Four vertical plates on the ovary ... 12. ANPLECTRUM.

\*\*\* Stamens equal or nearly so.

Connective not at all or very shortly produced at the base, but having 2 tubercles in front and a spur behind ... 13. MEDINILLA.

Anthers not produced at the base; connective with tufted

beard at the base behind but not spurred ... ... 14. Pogonanthera.

Connective not produced at the base and with no appendages in front, but minutely spurred behind, not

bearded ... ... ... 15. PACHYCENTRIA.

SUBORDER II. ASTRONIEM. Ovary 4-5-celled; ovules very many on parietal nearly basal placentas. Seeds very many. Anthers short, opening by slits. Fruit baccate.

Calyx-tube smooth. Panicles terminal ... ... 16. ASTRONIA.

Calyx-tube verrucose. Cymes small ... 17. PTERNANDRA.

SUBORDER III. MEMECYLEE. Ovary 1-celled; ovules about 9 on a basal short free-central placenta. Stamens equal; anthers short, opening by pores or short slits. Berry 1-seeded.—Leaves usually pinnatenerved.

Stamens 8 ... ... 18. MEMECYLON.

## 1. OTANTHERA, Blume.

Slender shrubs. Leaves membranous, entire, 3-5-nerved. Panicles terminal or sub-terminal, lax, cymose, few-flowered. Calyx bearing on its ovoid tube simple or tufted bristles, rarely glabrous, the lobes 5 or 6, equal to or shorter than the tube, deciduous. Petals 5-6, obovate, the apex rounded or acute. Stamens subequal, 10-12; anthers opening by a terminal pore, not beaked, the connective not produced at the base, or slightly biauriculate in front. Ovary half-inferior, with 5 or 6 bristles at its apex, 5-6-celled; style filiform, simple; ovules numerous on axile placentas. Fruit 5-6-celled, baccate. Seeds small, curved, punctate. Distrib. Species 7 or 8; Malaya, Burma, Philippines, N. Australia.

Calyx-tube bearing simple bristles ... 1. O. celebica.
Calyx-tube quite glabrous ... ... 2. O. nicobarensis.

1. Otanthera celebica, Blume, Mus. Bot. Lugd. Bat. I, 56. Leaves narrowly elliptic, shortly acuminate: upper surface sparsely strigose, the nerves glabrous, lower usually glabrous, the main nerves (and sometimes the minor also) with sub-adpressed bristles: length 2·25-3·5 in., breadth ·5-1·5 in., petioles ·2-4 in. long. Calyx-tube with simple acuminate bristles often bulbous at the base, the teeth setose. Naud., Ann. Sc. Nat. Ser. 3, XIII, 353; Cogn. in DC. Mon. Phan. VII, 342.



Andaman Islands; common, King's Collectors. Distrib. Celebes. 2. Otanthera nicobarensis, Teysm. et Binn. Pl. Nov. Hort. Bogor. 29. Leaves lanceolate or oblong-ovate, acuminate, upper surface sparsely strigose, the nerves glabrous; lower glabrous except the strigose nerves; length 3 to 4.5 in., breadth 1.25 to 2 in., petioles 5 to 1 in. Calyx-tube quite glabrous; the teeth sub-ciliate. C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 522; Kurz, Journ. As. Soc. Bengal, 1876, pt. II, 131; Cogn. in DC. Mon. Phan. VII, 342.

NICOBAR ISLANDS; Novara Expedition.

This has been collected only by the botanists of the Austrian expedition. It is the only species of the genus with a glabrous calyx.

### 2. MELASTOMA, Linn.

Scaly, strigose or villous shrubs. Leaves petioled, oblong or lanceolate, entire, 3-7-nerved. Flowers terminal, solitary, clustered or panicled,
rose or purple, 5- (rarely 6-7-) merous. Calyx-tube ovoid or campanulate, with simple (rarely with penicillate) hairs, lobes deciduous. Petals
equal in number to the calyx-lobes. Stamens twice as many as the
petals, very unequal, alternate longer ones with purple anthers having
the connective long-produced at the base and terminating in two lobes, the
shorter ones having yellow anthers, the connective not produced but
with two tubercles in front. Ovary ovoid, more or less united to the
calyx-tube, 5- (rarely 6-7-) celled, apex bearing bristles; style filiform,
simple; ovules very numerous, placentas axile. Fruit berried, succulent
or coriaceous, enveloped in the calyx-tube, bursting irregularly. Seeds
minute, very many, curved through half a circle, minutely punctate.—
Distrib. Species 40; Asia, North Australia and Polynesia.

Calyx-tube densely covered with long, flexuose, spreading, shining, coloured bristly hairs '25 to '5 in. long; young branches, petioles, and pedicels with stiff spreading bristles; flowers 2 to 3 in. in diam.

- 1. M. decemfidum.
- Calyx-tube, young branches, petioles and pedicels with adpressed, lanceolate acuminate, serrulate scales: cymes condensed, flowers 1.25 in. across
- 2. M. imbricatum.
- Calyx-tube densely clothed with linear acuminate, entire or serrate scales, those of the young branches, peticles and pedicels shorter and broader; corymbs with deciduous (often large) bracts; flowers 2 to 3 in. across (only 1.25 in var. perakensis) ...
- 3. M. malabathricum.
- 1. Melastoma decemfidum, Roxb. Hort. Beng. 90; Fl. Ind. II, 406. A shrub, 5 to 10 feet high; young branches at the nodes and near the tips, petioles and pedicels with numerous stiff, spreading bristles. Leaves narrowly-lanceolate or oblong-lanceolate, acuminate, 3- to 5-nerved; the upper surface smooth except for a few scattered

adpressed hairs, the lower glabrous, glandular-punctate; length 2.5 to 5 in., breadth '6 to 1.8 in.; petiole '25 to '5 in. long. Flowers solitary or two or three together, bright purple, 2 to 3 in. in diam., the bracts few, short, acuminate; pedicels under 5 in. Calyx-tube densely covered with long, flexuose, shining, coloured, bristly hairs; 25 to 5 in. long, the teeth rather shorter than the tube, ovate-lanceolate, acuminate, glabrous inside, deciduous. Fruit '75 in. in diam., truncate at the apex, ovoid to ovoid-globular, 5 in. in diam. Jack in Trans. Linn. Soc. XIV, (1822) 6; DC, Prodr. III, 146; Naud., Ann. Sc. Nat. Ser. 3, XIII, 282; Bl. Mus. Bot. I, 55; Cogn. in DC. Mon. Phan. VII, 345. M. sanguineum, Sims in Bot. Mag. t. 2241; DC. Prodr. III, 145; Don in Mem. Wern. Soc. IV, 289; Miq. Fl. Ind. Bat. I, pt. I, 504; Naud. Lc. 281; Triana in Trans. Linn. Soc. 60; C. B. Clarke in Hook, fil. Fl. Br. Ind. II, 524; Hemsl. in Jour. Linn. Soc. XXIII, 300. M. malabathrica, Sims in Bot. Mag. (not of Linn.) 529. M. Gaudichaudianum, Naud. 1.c. 278. M. macrocarpum, Naud. l.c. 281 (not of Don). M. porphyreum, Bipp. et Bl. in Flora 1831, II, 487. M. pedicellatum, Naud. l.c. 280; Cogn. in DC. Mon. Phan. VII, 346.

Penang; Wallich 4042! King, Curtis 683. Malacca; Griffith (K.D.) 2245/1! Maingay 773, 774! Ridley 3228. Pahang; Ridley 2667. Kedah; Ridley 5211. Perak; Scortechini 2123! King's Collector 1540, 1853, 8754. Distrib. Burma, China, Hongkong, Tonkin.

VAR. mollis, Clarke in Hook. fil. Fl. Br. Ind. II, 524. Young branches very hispid throughout their whole length; leaves with numerous subadpressed and spreading stiff hairs on both surfaces, especially on the nerves. Vidal Syn. Pl. Filip. t. 51; fig. D. M. molle, Wall. Cat. 4046; Triana in Linn. Trans. XXVIII, 60; Cogn. in DC. Mon. Phan. VII, 346. M. crinitum, Naud. 1.c. 524. M. malabathricum Blanco, Fl. Filip. Ed. III, tab. 152 (not of Linn.).

SINGAPORE; Wallich. DISTRIB. Luzon; Cuming 853.

2. Melastoma imbricatum, Wall. Cat. 4047. A spreading sbrub, 5 to 15 feet high; young branches (especially at the nodes and tips), petioles, pedicels and calyx covered with adpressed, lanceolate acuminate, serrulate scales. Leaves elliptic-oblong to ovate-oblong, rather abruptly narrowed at the base, the apex acute or acuminate; main nerves 5 (the two lateral slender); both surfaces strigose, the main nerves on the lower with adpressed scales; length 3.5 to 8.5 in., breadth 1.5 to 4.5 in., petiole 35 to 1.35 in. Cymes solitary, terminal, condensed, 1.5 to 2 in. in diam., enclosed in bud by deciduous, lanceolate bracts and bracteoles. Flowers 7 to 15, 1.25 in. in diam.; the pedicels 15 in. long. Calyx-tube urceolate, the teeth shorter than the tube, lanceolate-acuminate, deciduous. Petals oblong. Anthers short. Fruit ovoid-globose or sub-globose, truncate and shortly toothed at the mouth.

pulpy, 8 in. in diam. when ripe. Triana in Trans. Linn. Soc. XXVIII, 60; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 524; Cogn. in DC. Mon. Phan. VII, 355. M. obovatum var. oblongum, Bl. ex Triana l.c. 60.

PERAK; Scortechini 162! King's Collector 444, 6023, 8696, 10946! Wray 2980. Penang; Wallich, Curtis. Distrib. Sumatra, Forbes 2072! Brit. India (Khasia and Assam); Tonquin.

Easily recognised by its condensed cymes and rather small flowers.

3. Melastoma malabathricum, Linn. Sp. Pl. 559. A spreading shrub, 3 to 6 feet high; young branches, petioles and pedicels densely clothed with rather short, acute to acuminate, often serrulate scales. Leaves ovate-lanceolate, ovate-oblong or elliptic, the apex acute or shortly acuminate, petioles short, 3- to 5-nerved (the marginal pair when present slender); both surfaces strigose, the hairs sparser on the upper and pale; on the lower the hairs more numerous (especially on the minor nerves) and darker, the main nerves clothed with broad-based acuminate scales: length 2 to 5.5 in., breadth .75 to 2.5 in.; petioles ·2 to ·5 in. long. Corymbs terminal, few-flowered, enveloped in bud by large, deciduous, ovate-cordate bracts; flowers 2 to 3 in. across, the pedicels 2 to 4 in. long. Calyx; the tube cylindric-campanulate. densely clothed externally with linear acuminate, entire or serrate, pale scales, almost glabrous within; the teeth shorter than the tube (rarely equal to it), acute or abruptly acuminate, the apex deciduous, scaly only near the midribs. Flowers 2 to 3 in. across. Petals purple. Fruit subglobular, truncate, pulpy, 25 in. in diam. when dry. DC. Prodr. III, 145; Roxb. Hort. Beng. 33; Fl. Ind. II, 405; Wall. Cat. 4040; Bl. Bijdr. 1076; Bot. Reg. t. 672; W. and A. Predr. 324; Wight Ill. t. 95; Dalz. and Gibs., Bomb. Fl. 92; Naud. in Ann. Sc. Nat. Ser. 3, XIII, 285; Thwaites Enum. 106 (a and  $\beta$ ); Benth. Fl. Aust. III, 293; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 523; Kurz, For. Fl. I, 503, not of Miq. Fl. Ind. Bat. I, pt. I, 507; Naud. in Ann. Sc. Nat. Ser. 3, XIII, 273; Cogn. in DC. Mon. Phan. VII, 349. M. affine, D. Don in Mem. Wern. Soc. IV, 288; DC. Prodr. III, 145. M. obvolutum, Jack in Trans. Linn. Soc. XIV, 3; Cogn. in DC. Mon. Phan. VII, 348. M. articulatum, M. heterostegium, M. novæ-hollandiæ and M. sechellarum, Naud. in Ann. Sc. Nat. Ser. 3, XIII, 285, 286 and 290. M. velutinum, Seem. Fl. Vit. 90. M. Banksii, Cunn. ex Triana. Trembleya rhinanthera, Griff. Not. IV, 677.

In all the provinces. DISTRIB. British India and Malayan Archipelago, W. China, Seychelle Islands, N. Caledonia, N. Australia.

A widely distributed species varying in reality very little in localities widely separated. The differences have however been taken as the bases of many bad and doubtful species. In his Flora Australiensis, Mr. Bentham remarks (and apparently with justice) that the whole twenty-four species described by Naudin in Ann. Sc.

Nat. Ser. 3, XIII, pp. 283 to 293; should be reduced here. It is not without reluctance that I give four varieties as follows:—

Var. 1. polyantha, Benth. Fl. Aust. III, 292. Bracts of inflorescence small and very early deciduous or altogether absent; teeth of calyx usually short; leaves not exceeding 2.5 in. in length. M. polyanthum, Blume in Flora for 1831, 480; Mus. Bot. I, 52, t. 6; Naudin in Ann. Sc. Nat. Ser. 3, XIII, 287; Miq. Fl. Ind. Bat. I, pt. I, 502; Triana in Linn. Trans. XXVII, 59; C. B. Clarke in Hook. fil. Fl. Br. Ind. III, 523. M. brachyodon, Naud. l.c. 292; Miq. Fl. Ind. Bat. I, 570, t. 8, fig. A. M. malabathricum, Desr. in Lam. Encyc. Bot. IV, 36; Ill. Gen. tab. 361, f. 1; Jack in Linn. Trans. XIV, 4, fig. 1, a to g; Poir. Dict. IV, 37; Bl. Bijdr. 1070. M. erecta, Jack l.c. 5; DC. Prodr. III, 145. M. tidorense, Bl. in Flora 1831, p. 482, Miq. l.c. 514. M. Royenii, Bl. l.c. 483. M. tondanense, Bl. Mus. Bot. I, 54. M. Hombronianum, M. oliganthum and M. microphyllum, Naud. l.c. 278, 292 and 293.

Andamans; King's Collector. Singapore; Anderson, King. Malacca; King. Penang; Curtis, King. Distrib. Burma, N. China, Sumatra, Java and other islands in the Malay Archipelago, Luzon, N. Australia.

Var. 2. adpressa, C. B. Clarke in Hook, fil. Fl. Br. Ind. II, 523. Leaves narrowly oblong-lanceolate, smaller than in the typical plant and with harsher pubescence. M. adpressum, Beuth. in Wall. Cat. 4081, Naud. l.c. XIII, 27; Cogn. in DC. Mon. Phan. VII, 349. M. anophanthum, Naud. l.c. 277.

MALACCA; Maingay 771 to 773 in Herb., Kew. Penang; Wallich, King, Curtis. Province Wellesley; Curtis.

This is scarely worthy of separation as a variety. It is slightly smaller and more strigose than the type and differs from VAR. polyanthum, so far as I can see, only by the large size of the bracts of the inflorescence.

Var. 3. normalis, King. Hairs of both surfaces very numerous, those of the upper sub-adpressed, of the lower sub-spreading, softer (almost silky); calyx-teeth long, adpressed hairy within. M. normale, Don Prodr. Fl. Nep. 220; DC. Prodr. III, 145; Naud. in Ann. Sc. Nat. Ser. 3, XIII, 289; Kurz, For. Flora I, 504; C. B. Clarke in Hook, fil. Fl. Br. Ind. II, 524; Triana in DC. Mon. Phan. VIII, 352. M. Wallichii, DC. 1.c. 146. M. napalense, Lodd. Bot. Cab. t. 707. M. pelagicum, Naud. 1.c. 279. M. longifolium, Naud. 1.c. 293.

In most of the provinces.

Var. 4. perakensis, King. Leaves more or less broadly elliptic, 5- to 7-nerved, the upper surfaces strigose (sometimes nearly glabrous in old specimens), the lower softly and rather densely pubescent; branches, petioles and pedicels with long, spreading, rather soft hairs; calyx-tube densely clothed with long, flexuose, soft, often ciliate setae,

the lobes large, adpressed strigose on both surfaces: flowers occasionally only 1.25 in. in diam.

Perak; Ridley 2935! Curtis 1298! Wray 1733, 1883! King's Collector 2173, 2091, 8463! Scortechini 780. Singapore; Hullet 5728. Selangore; Ridley 1996. Distrib. Java; Forbes 1142a.

This has broader leaves more softly hairy than VAR. normalis. The bristles of the calyx are much longer than in any other form of M. malabathricum and approach in number, length and density those of M. sanguineum, Don. A form of this from Perak, with the calyx-hairs shorter than the type, connects it with M. imbricatum, Wall.

### 3. OXYSPORA, DC.

Large spreading shrubs with drooping branches terminated by large, lax, almost naked panicles of rose-purple flowers. Leaves opposite, long-petioled, large, 5- to 7-nerved, ovate, acuminate. Panicle long, lax, sometimes narrow, the branches decussate, the flowers on the branchlets not glomerulate, bracts very small. Calya-tube ovate, cylindric or funnel-shaped, its teeth 4, short, triangular. Stamens 8, four large with elongated anthers and four small, or all equal, opening by a single apical pore; the base produced and bilobed, the connective with or without an appendage. Ovary inferior, 4-celled, its apex glabrous; style simple, elongate; ovules numerous; the placentas axile, radiating. Capsule dry, elongate, double fusiform, with 8 ribs. Seeds numerous, falcate; the raphe lateral, produced at the apex into a point in front. Distrib. Seven species, Indian and Malayan.

Anthers dissimilar; petioles	not winged			1.	O. stellulata.
Anthers similar :-					
Petioles not winged	•••		•••	2.	O. acutangula.
" winged	* To	***		3,	O. Curtisii.

#### NOTE.

The genera Allomorphia and Oxyspora were so difficult of separation even before the discovery of the new species herein described (viz., A. alata, Scort., O. acutangula and O. Curtisii) that Baillon (Hist. des Plantes VII, 48) united them. In Baillon's time Oxyspora was distinguished mainly by having four of its eight stamens much larger than and differently coloured from the other four. The three older species (all British Indian) O. paniculata, O. vagans, and O. cernua and the new Malayan one O. stellulata have this character, which would form an excellent head-mark for the genus if it did not break down. The character, however, does break down, for in the two Malayan plants here published as O. acutangula and O. Curtisii the eight anthers are all equal, although in all other respects these plants have the facies of the older species of Oxyspora. I have referred these to Oxyspora as preferable to the alternative course of putting them into Allomorphia, and I have therefore, in order to admit them, modified the generic character of Oxyspora as regards anthers. Oxyspora, as here defined, thus depends for its separation as a genus on its open paniculate inflorescence and long double fusiform boldly-ridged capsules, while Allomorphia is characterised by shortly-branched panicles, on the ultimate branchlets

of which the flowers are clustered in pseudo-glomeruli, while the capsules are not much longer than broad and are often urn-shaped.

1. Oxyspora stellulata, King, n. sp. A shrub, 15 to 20 feet high; young branches, petioles, inflorescence and calyx-tube covered with pale, minute, stellate-hairy scales. Leaves somewhat unequal, ovate, slightly cordate at the rounded base, the apex shortly apiculate, 7-nerved (the middle nerve very strong); both surfaces free from hairs, but (especially the upper) with numerous minute hairy scales most numerous on the nerves, the transverse veins on the lower very distinct and straight; length 5 to 9 in.; breadth 2.25 to 4.5 in.; petiole 1.25 to 4 in. Panicle solitary, terminal, longer than the leaves; the branches in pairs, divaricate; flowers in umbels of 4 to 6 on the ultimate branchlets. Calyx-tube funnel-shaped, sub-tetragonous, the mouth with four small triangular teeth, narrowed at the base into the short pedicel. Petals 4, orbicularovate, blunt, glabrous. Stamens 8, very unequal, four linear, purple and twice as long as the other 4 short, yellow. Disc of 4 incurved plates. Ovary 4-winged. Capsule clavate, opening by 4 broad truncate valves; seeds minute, shortly beaked.

PERAK; Scortechini 249 in part! King's Collector 418, 2851! Wray 1224. DISTRIB. Sumatra, Forbes 3034.

2. Oxyspora acutangula, King, n. sp. A bush; young branches boldly 4-angled, glabrous. Leaves elliptic-oblong, somewhat narrowed to the rounded base, the apex acute, 5-nerved; upper surface glabrous, the lower minutely lepidote-pubescent on the nerves and veins; length 4 to 6 in., breadth 1.75 to 2.5 in, petiole 6 to .75 in, minutely lepidote. Panicle solitary, terminal, usually somewhat shorter than the leaves, broadly pyramidal, lepidote-puberulous, many-flowered. Flowers (including the stamens) 5 in. long. Calyx-tube funnel-shaped, minutely rufous-stellate lepidote, the mouth with 4 small triangular teeth. Petals 4, glabrous, broadly ovate, blunt. Stamens 7 or 8, equal, lanceolate, acuminate, slightly curved, the lobes at the base short, rounded, appendages none, but a grooved, narrow process on the back of the connective in the lower half. Capsule ovoid, narrowed to the equally long pedicel, 8-ridged, glabrous, the mouth with an everted rim, .25 in. long.

PERAK; Wray 329.

3. Oxyspora Curtisii, King. A shrub; branchlets bluntly 4-angled not winged, puberulous. Leaves ovate-acuminate, the base rounded, not passing into the petiole, 7-nerved, upper surface sparsely strigose, minutely lepidote, the lower glabrous, the edges glandular-serrulate; length 5 to 7 in., breadth 3 to 4 in., petioles 1.5 to 2.5, broadly winged, the wing much expanded at the base and joining that of the opposite leaf. Panicle solitary, terminal, spreading, longer than the leaves, with

numerous 4-angled branches, bracteate, everywhere minutely lepidote; the larger branches bearing a pair of very unequal bracts near the base exactly like the stem-leaves but smaller. Flowers on slender pedicels as long as the calyx-tube. Calyx-tube cylindric, 8-ribbed, tapering to base and apex; the mouth expanded and truncate but with 4 minute teeth. Petals 4, as long as the scaberulous filaments. Stamens 8, much exserted; the anthers longer than the filaments and longer than the calyx-tube, linear, acuminate, very slightly lobed at the base and inappendiculate. Capsules fusiform, '2 in. long, much expanded at the mouth.

PERAK; Curtis 1300.

The only specimen of this which I have seen is in Mr. Curtis's Herbarium.

The species resembles Allomorphia alata, Scort. in its eight equal stamens, in the shape of its leaves and in its winged peticles; but differs in its more elongated capsules (which are fusiform instead of globose), in its larger laxer panicles and in its conspicuously bristle-serrate leaves. The two species just described form very marked connecting links between the genera Allomorphia and Oxyspora.

# 4. ALLOMORPHIA, Blume.

Shrubs, tall or short. Leaves opposite, long-petioled, large, lanceo-late, ovate or orbicular, nerved, glabrous or nearly so. Panicles terminal, compound, with small flowers in clustered whorls. Calyx-tube funnel-shaped or campanulate, limb of 3 or 4 very short lobes. Petals 3 or 4, rose or white, small. Stamens 6 or 8, nearly equal; anthers attenuated at the top with one pore, cells long-produced and diverging at their bases; connective without appendage. Ovary 3- (rarely 4-) celled, enclosed by but nearly free from the calyx-tube; style filiform, simple; ovules very many, placentas axile, 2-fid. Capsule small, dry, not much longer than broad, usually urn-shaped, ribbed, opening at the top by 3-4 valves. Seeds very many, narrowly obtrapezoidal. Distrib. Species 5: whereof 4 are from the Malay Peninsula and its attached islands; 1 from Canton.

Petioles not winged:

Calyx-tube with 3 or 4 teeth; stamens unequal; anthers sagittate at base; capsule ribbed

Calyx-tube without teeth; stamens equal; anthers only slightly

lobed at the base; capsules not ribbed ... 2. A. Wrayi.

Branches of the panicle winged; capsule sub-globular ... 3. A. alata.

1. ALLOMORPHIA EXIGUA, Blume in Flora 1831, II, 528. A shrub, 2 to 10 feet high; branches slender, subangular, puberulous or glabrous. Leaves elliptic-ovate to ovate-lanceolate, acuminate, those of the same pair often unequal in size; the base rounded or narrowed, not cordate;

apper surface very sparsely strigose (glabrous in old leaves); the lower glabrous, pale, the transverse nerves prominent; length 4.5 to 11 in.; breadth 1.5 to 5 in.; petiole .75 to 4 in. Panicle usually solitary, terminal, often longer than the leaves, lax, minutely rusty-pubescent; bracts lanceolate or oblong, deciduous; the flowers 1 in. long, shortly pedicellate, in stalked umbels on the ultimate branchlets or in subsessile fascicles. Calyx rusty-puberulous, with 3 or 4 short broad teeth. Stamens 6 or 8, alternately long and short, sagittate at the base and with a small linear appendage behind. Petals 3 or 4, rosy. Capsule less than 1 in. long, boldly 6-ribbed. Naud. in Ann. Sc. Nat. Ser. 3, XV, 310; Triana in Trans. Linn. Soc. XXVIII, 74; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 527; Cogn. in DC. Mon. Phan. VII, 464. Melastoma exigna, Jack in Trans. Linn. Soc. XIV, 10, tab. 1, fig. 2; DC. Prod. III, 149. M. impuber, Roxb. Fl. Ind. II, 405; Wall. Cat. 4048.

Malacca; Griffith 2263 & 4 (K.D.); Maingay 776 (K.D.); Harvey. Penang; Wallich 4048; Curtis 399; Griffith; King. Penan; Scortechini 227, 383; Wray 160; King's Collector 450, 2302, 3106. DISTRIB. Sumatra; Forbes 3062.

There is some variety in this plant as regards size and inflorescence. A slender form, which never exceeds 2 or 3 feet in height and which has smaller leaves than the type, seems worthy of separation as a variety. It appears to have been so recognised by Wallich who, in distributing his Herbarium, distinguished it by the letter a. A less distinctly marked form is one in which the flowers are grouped on the branches of the inflorescence in dense almost sessile fascicles.

Var. minor, King. Leaves narrowly elliptic, tapering much to base and apex, 2 to 45 in. long; inflorescence slender, few-flowered, very lax: height only 2 to 3 feet.

Penang; Wallich, Cat. 4048a; Curtis 73. Perak; Scortechini 1702; Wray 161, 3414; King's Collector 2302.

2. ALLOMORPHIA WRAYI, King, n. sp. A shrub, 2 to 4 feet high; branches and petioles with flexuose, spreading, ferruginous hairs. Leaves 7-nerved, broadly ovate to rotund-ovate, the apex shortly and abruptly acuminate, the base narrowed, the edges obscurely and minutely bristle-toothed: upper surface very sparsely strigose or glabrous, often with minute, brown scales on the chief nerves; lower glabrous; length 5 to 9 in., breadth 3.5 to 5.5 in.; petiole 2.25 to 2.75 in. Panicles solitary, axillary, slightly longer than the petioles but much shorter than the leaves, glabrous or rusty puberulous towards the extremities: the branches short, spreading, rather condensed when young, few flowered. Calyx-tube widely campanulate, minutely rusty-puberulous or almost glabrous, without ribs; the mouth truncate, slighly waved but not toothed. Petals 4. Stamens 8, equal, the anthers lobed but not sagittate at the base, the back with a slight supra-basal appendage

Capsule glabrous, sub-globular, slightly contracted below the sub-membranous truncate mouth, under 'l in. in diam.

Perak; Wray 2483; King's Collector 2061, 2380, 2773; Scortechini 50, 425. Penang; Curtis 2008.

A species allied to A. exigua, Bl. but with pubescent branches and petioles, shorter and more contracted panicles, a wider, toothless calyx-tube, sub-globular capsules and equal anthers only slightly lobed at the base. In Mr. Wray's field-note on his specimens he remarks that the flowers are white and the leaves dark shining green above and crimson beneath.

3. ALLOMORPHIA ALATA, Scortechini Mss. A glabrous shrub, 3 to 6 feet high; the branchlets broadly winged. Leaves ovate or ellipticovate, the apex shortly acuminate; the base narrowed into the broadlywinged petiole, 5-nerved; both surfaces glabrous, the edges shortly bristle-toothed; length 5 to 10 in., breadth 2.5 to 4.5 in., petiole .75 to 4 in. Panicle solitary, terminal, often nearly as long as the leaves, lax; its branches diverging, 4-angled and 4-winged, very minutely rusty lepidote-puberulous. Flowers clustered in small umbels near the ends of the branches, the bases of the umbels sometimes with a ring of bracteoles and minute imperfect flowers. Calyx-tube cylindric-ovoid, the limb expanded and with 4 small, persistent teeth. Petals 4, twice as long as the calyx-teeth but shorter than the filaments. Stamens 8, equal, exserted, much longer than the calvx-tube. Anthers linear-acuminate. longer than the scaberulous filaments, very slightly lobed at the base and almost inappendiculate. Capsules sub-globular, 8-ribbed, glabrous, the mouth truncate, diam. 1 in.

Perak; Scortechini 236; Wray 1327; Ourtis; King's Collector 572, 2047.

The leaves of the same pair differ, often considerably, in size.

# 5. BLASTUS, Lour.

Shrubs. Leaves membranous, petiolate, ovate- or oblong-lanceolate, acuminate, entire or sinuate-serrate, 3- to 5-nerved. Flowers small 4-merous, ebracteolate. Calyx-tube oblong-campanulate or shortly oblong; the limb not expanded, truncate, minutely 4-lobed. Petals 4, ovate, obtuse, glabrous, convolute into a cone before expansion. Stamens 4, equal, the filaments thin: anther incurved subulate, opening by a single apical pore; basal lobes divaricate, the connective inappendiculate. Ovary adhering to the calyx, 4-celled; style filiform; stigma punctiform. Capsule obovoid or sub-globular, slightly 4-grooved; dehisching slowly by 4 valves. Seeds minute, numerous, irregularly recurved, reniform. Distrib. 3 species in Malaya, China, Cochin China and India.

BLASTUS COGNIAUXII, Stapf in Hook. Ic. Pl. t. 2311. A shrub, 6 to 10 feet high; young branches slender, as thick as a crow-quill, scaly, glabrous or puberulous. Leaves equal, oblong-lanceolate, narrowed at the base, the apex acuminate, 5-nerved (the marginal pair faint), the edges sub-entire; upper surface glabrous, with a few scattered, small glands; lower glandular-punctate, minutely furfuraceous on the nerves; length 4 to 7 in.; breadth 1 to 2.25 in., petiole 3 to 75 in. Panicles axillary or terminal, slender, much shorter than the leaves, glandular-scaly, the few divaricate branchlets bearing the flowers in dense terminal glomeruli of 6 to 9. Calyx shortly tubular, scaly, the teeth minute. Anthers narrowly ovate with many small yellow glands near the base. Capsule subglobular, truncate, 1 in. in diam., subglabrous; seeds linear. Ochthocaris parviflora, Cogn. in DC. Mon. Phan. VII, 421.

PERAK; common. DISTRIB. Borneo.

This is closely allied to B. cochinchinensis, Lour., but differs notably in its paniculate inflorescence.

### 6. OCHTHOCHARIS, Blume.

Small, erect, glabrous shrubs, branches round or obtusely 4-angled. Leaves opposite, petioled, oblong or lanceolate, 3-7-nerved, minutely denticulate-serrulate. Flowers minute, in axillary clustered cymes, rarely in axillary lax cymes or in lax terminal cymose panicles. Culyxtube obovoid, smooth; teeth 5, small, persistent. Petals 5. Stamens 8 or 10, equal; anthers oblong, obtuse at the top, opening with one pore, at the base shortly produced or not; connective with or without an appendage. Ovary inferior, 4- or 5-celled, glabrous at the apex; style simple, filiform; ovules very many, placentas axile. Capsule globose, 5-valved, enclosed by the membranous calyx-tube. Seeds very many, irregularly club-shaped. Distrib. Species 5 or 6, extending from Singapore to Borneo.

Connective of anthers with no appendage at the base behind:-

Flowers in a terminal panicle, 5-merous ... 1. 0. paniculata., fascicles, 4-merous ... 2. 0. borneensis.

Connective of anthers with an appendage at the base be-

Erect; flowers 5-merous; leaves 3-nerved ... 3. 0. javanica.

Decumbent; flowers 4-merous; 5- to 7-nerved... 4. 0. decumbens.

1. Ochthocharis paniculata, Korth. in Verh. Nat. Gesch. Bot. 247 t. 64. A small shrub with slender quadrangular branches, rusty pubescent towards the tips. Leaves membraneous, elliptic-lanceolate, tapering to each end, the edges minutely bristle-serrate, 5- to 7-nerved (the marginal pair faint); upper surface glabrous; the lower somewhat pale,

scaly-puberulous on the nerves and prominent transverse veins; length 2.5 to 5 in., breadth 1.25 to 2 in., petiole .35 to 8.5 in. Panicle cymose, terminal, spreading, less than half as long as the leaves; branches opposite, pedicels unequal, bracteolate at the base, not quite so long as the flowers. Petals 5, ovate-acuminate. Stamens 10, anthers oblong, blunt, not produced at the base and with the connective inappendiculate. Capsule depressed-globular, glabrous, with 5 shallow grooves, 2 in. in diam. Blume Mus. Bot. I, 40; Naud. in Ann. Sc. Nat. ser. 3, XV, 307, with fig.; Miq. Fl. Ind. Bat. I, pt. I, 556; Triana in Trans. Linn. Soc. XXVIII, 74. C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 528; Cogn. in DC. Mon. Phan. VII, 480. Melastoma oxyphyllum, Benth. in Wall. Cat. 4083.

SINGAPORE; Wallich. DISTRIB. Borneo.

2. Ochthocharis borneensis, Blume Mus. Bot. Lugd. Bat. I, 40. A shrub, 3 or 4 feet high. Leaves membranous, elliptic-lanceolate, 5-nerved (the lateral pair small), acuminate, the base cuneate, the edges minutely dentate, upper surface glabrous, the lower pale, minutely and furfuraceously stellate-hairy on the main and rather prominent tranverse nerves; length 3 to 4.25 in.; breadth 1.25 to 1.75 in.; petioles sparsely stellate-hairy, unequal, 3 to 1.8 in. long. Flowers in fascicles of 4 to 7, from tubercles on the stem below the leaves; the buds conical, 1 in. long; pedicels slender, ebracteolate, '25 to '3 in. long. Petals 4, broadly ovate, narrowly acuminate. Stamens 8; the anthers oblong, blunt, neither produced nor appendiculate at the base. Capsule depressed-globular, glabrous, faintly 5-grooved, '2 in. in diam. Naud. in Ann. Sc. Nat. Ser. 3, XV, 307; Cogn. in DC. Mon. Phan. VII, 480. O. buruensis, Teysm. and Binn. in Nat. Tijdschr. Ned. Ind. XXV, 426; Miq. in Ann. Bot. Lugd, Bat. I, 216.

SINGAPORE; Ridley 6221. DISTRIB. Borneo, Molluccas.

3. Ochthocharis javanica, Blume in Flora 1831, 523. A shrub, 2 or 3 feet high. Leaves subcoriaceous, lanceolate or oblong-lanceolate, acute, the base cuneate, 3-nerved; both surfaces glabrous and with the nerves indistinct; the lower rather pale when dry, the edges remotely bristle-serrate; length 2 to 35 in.; breadth 6 to 1 in.; petiole 2 to 5 in. Cymes or fascicles about as long as the petioles, few-flowered; pedicels slender, minutely bracteolate at the base, 15 to 45 in. long. Flower-buds 15 in. long, much pointed. Petals 5, broadly ovate, abruptly acuminate. Anthers 5, twice as long as the filaments, minutely spurred at the base behind. Capsule subglobular, with 5 shallow grooves, glabrous, 15 to 2 in. in diam.; the placentas persistent, woody, rough on their outer surfaces. Naud. in Ann. Sc. Nat. Ser. 3, XV, 307; Miq. Fl. Ind. Bat. I, pt. I, 556; Kurz, For. Fl. I, 507. Triana Melast. 74, tab. VI, fig. 67; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 528;

Cogn. in DC. Mon. Phan. VII, 480. Melastoma? littoreum, Wall. Cat. 4087.

A sea-shore plant, SINGAPORE, JOHORE, MALACCA, PERAK. DISTRIB. Burma, Borneo, Java.

4. Ochthocharis decumbens, King, n. sp. A creeping or decumbent shrub, 3 to 5 feet long; stems as thick as a swan's quill, rounded, often rooting at the nodes. Leaves thinly coriaceous, elliptic-lanceolate, shortly acuminate, rounded or cuneate at the base, the edges obscurely bristle-serrate, 5-7-nerved; upper surface glabrous; the lower pale and with a few minute, scattered scales; length 5 to 7.5 in.; breadth 2 to 3 in.; petioles unequal, stout, sparsely scaly, 5 to 1.25 in. long. Flowers in dense, axillary cymes shorter than the petioles, the pedicels short, bracteolate. Calyx-tube glabrous, faintly ribbed, the teeth 4, small. Petals 4, broadly ovate, acuminate. Stamens 8; the anthers curved, tapering to the truncate apex, slightly produced at the base and with a minute tubercle behind. Capsule depressed-globose, glabrous, faintly 4-grooved, '18 in. in diam.

PERAK; King's Collector, 2833, 10425.

#### 7. Anerincleistus, Korth.

Shrubs; branches often round. Leaves petioled, ovate or lanceolate, entire, 3-7-nerved. Flowers small. Calyx-tube campanulate or funnel-shaped; lobes 4, usually very small. Petals 4, minute, glabrous. Stamens 8, equal; anthers attenuate at the top, opening by one pore, scarcely produced at the base; connective with or without a short spur. Ovary nearly free, 4-celled; style filiform, simple; ovules many. Capsule splitting by 4 large valves at the summit. Seeds exceedingly minute, cuneate-obovoid. Distrib. Species 9 or 10; Malaya and Burma.

Inflorescence umbellate; leaves small, oblong- or elliptic-lanceolate:—

Nearly glabrous in all its parts ... ... 1. A. macranthus.

More or less pilose:—

Calyx-tube mealy tomentose, the teeth narrow, glandular ciliate on the edges ... ... 2. A. Scortechinii.

Calyx-tube not tomentose but with many long spreading gland-tipped hairs, the teeth minute and without hairs 3. A. Curtisii.

Inflorescence a large panicle; leaves large, ovate:—

Panicle densely tomentose, leaves 7-nerved ... ... 4. A. floribundus.

Panicle clothed with short, flat, adpressed, scale-like hairs, leaves 5-nerved ... ... ... ... 5. A. sublepidotus.

1. ANERINCLEISTUS MACRANTHUS, King, n. sp. A small shrub; young branches with pale lenticels, glabrous except for a few adpressed hairs at the apices. Leaves nearly equal, elliptic-lanceolate, much narrowed to the base, the apex shortly acuminate; both surfaces

glabrous, the lower pale when dry; length 2.5 to 4 in., breadth 8 to 1.5 in., petiole 4 to 8 in., strigose. Umbels axillary or terminal, usually solitary, 4-5-flowered, on slender, sparsely strigose peduncles shorter than the leaves. Flowers (including the stamens) 5 in. long. Calyx-tube infundibuliform, sparsely adpressed-pilose, nearly as long as the slender strigose pedicel; the mouth with 4 narrowly triangular acuminate, erect, persistent teeth nearly as long as the tube. Petals 4, ovate, acuminate, glabrous, slightly longer than the calyx-teeth. Stamens 8, slightly unequal, the alternate 4 shorter but of the same shape as the longer 4, the base in all emarginate, scarcely lobed but with a very short process behind. Scales of disc 4, their apices broadly truncate and slightly toothed. Capsule globose-ovoid, 25 to 3 in. long.

PERAK; at elevations of 2000 to 4000 feet, Scortechini; Wray 297, 1621.

A species near to A hirsutus, Korth., but differing in being glabrous and in having larger flowers which, according to Mr. Wray, are pink. The umbels of this, when in bud, are enclosed in oblong, deciduous, sparsely strigose bracts.

ANERINCLEISTUS SCORTECHINII, King, n. sp. A slender shrub, 3 to 4 feet high; young branches, petioles and inflorescence with many spreading and sub-adpressed, gland-tipped hairs. Leaves very unequal (one of each pair very small), oblong, slightly narrowed to the rounded base, the apex acuminate, the edges ciliate; main nerves 3 to 5, the minor nerves transverse, rather faint; both surfaces usually glabrous, the upper sometimes sparsely strigose, the main nerves on both and the transverse on the lower surfaces bristle-hairy; length of the larger leaf of the pair 25 to 4 in., breadth 8 to 14 in.; petiole 3 to 4 in; the smaller leaf of the pair from one-fourth to one-half as large and subsessile. Inflorescence axillary, solitary on a slender peduncle about as long as the smaller leaf, umbellately cymose, 6- to 10-flowered. Calyxtube globose-campanulate, minutely mealy tomentose, about as long as the pedicel; teeth 4, narrow, reflexed, each ending in a bristle and the margins bearing 6 or 8 long straight hairs with small glandular apices. Petals 4, ovate, glabrous, shorter than the calyx-teeth, each with a slender, gland-tipped, reflexed hair at the apex. Anthers 8, equal, acute, very slightly lobed at the base and inappendiculate; style thick, straight; stigma small. Ovary crowned by obtuse, sometimes crenulate scales.

PERAK; Scortechini 51, 450; Curtis.

This closely resembles A. Curtisii, Stapf, but is distinguished at once by the calyx which has its tube covered with minute mealy pubescence while the teeth are long, reflexed, with long glandular hairs on the edges, whereas in A. Curtisii the calyx-tube bears many long glandular hairs and the teeth are triangular, minute 424

and hairless. The leaves of A. Curtisii moreover are strigose between the nerves on both surfaces.

3. ANERINCLEISTUS CURTISH, Stapf in Kew. Bull. for 1892, p. 196. A small shrub, like A. Scortechinii, the young branches, petioles, and inflorescence spreading slightly and not gland-tipped; leaves as in A. Scortechinii but strigose on both surfaces. Calyx-tube with numerous subulate, gland-tipped, spreading hairs; the teeth minute, triangular and without hairs. Anthers blunt.

PENANG; Curtis 412.

4. Anerincleistus floribundus, King, n. sp. A shrub, about 15 feet high: young branches, petioles and panicles densely and shortly tawny-tomentose. Leaves unequal, ovate, shortly acuminate, 7-nerved at the rounded base, (the main nerve giving off a pair about 1 in. from the base); upper surface with a few short scattered bristles, the main nerves densely bristly-pubescent; lower surface with short coarse hairs especially on the nerves and veins; length 5 to 9 in.; breadth 4 to 5.5 in.; petiole 1 to 2 in., one leaf of each pair smaller than the other. Panicle terminal, solitary, longer than the leaves, much branched, the branches unequal and in pseudo-whorls, many-flowered, the ultimate branchlets few-flowered, cymose. Calyx-tube funnel-shaped, tapering into and longer than the pedicel, adpressed-pilose: the mouth truncate and with 4 small broadly triangular teeth and 4 alternating tufts of inwardly-directed hairs. Petals 4, shorter than the calyx-tube, broadly triangular or occasionally quadrate, apiculate, glabrous. Stamens 8, equal, or 2 smaller and sometimes suppressed; anthers curved, with two deep broad lobes at the base but no appendage. Capsule broadly obovoid, truncate, tapering at the base; seeds minute, broadly linear.

PERAK; Scortechini 249 in part; Ridley 5342; Curtis 1299.

5. Anerincleistus sublepidotus, King, n. sp. A shrub, 10 to 15 feet high; young branches, petioles and inflorescence densely clothed with short, flat, adpressed, scale-like pale hairs. Leaves somewhat unequal, ovate, shortly acuminate, on long petioles, 5-nerved, entire; upper surface glabrous except for a few minute scale-like hairs, the main nerves hairy like the petiole; lower surface much reticulate, minutely lepidote-hairy, the middle nerve hairy like the petiole; length 4 to 8 in., breadth 2 to 4 in.; petiole 1 to 1.5 in. Panicle terminal, solitary, erect in flower, pendent in fruit, usually longer than the leaves, few-branched; the ultimate branches unequal, short, few-flowered, some of them in pseudo-whorls, pedicels less than 1 in. long. Calyx-tube 15 in. long, (when dry) reddish, clothed with scattered, adpressed scale-like hairs, tubular-campanulate; the teeth 4, short, acute. Petals 4, ovate, acuminate, glabrous, shorter than the caly tube. Stamens 8.

subequal, all yellow, curved, deeply lobed at the base but inappendiculate. Capsule obovoid, much tapered to the pedicel, '15 in. long (when dry), scabrid from the stiff, strigose, scale-like hairs. Seed minute subulate.

PERAK; Scortechini 310; King's Collector 8068.

#### NOTE.

I take the opportunity to describe here the undernoted new species from Borneo.

Anerincleistus glomeratus, King, n. sp. A shrub; young branches, petioles, main nerves of leaves and inflorescence densely covered with short, coarse, adpressed, pale hairs. Leaves narrowly oblong, narrowed towards the base, the apex acuminate; upper surface glabrous but with a few scattered glands; lower surface with a few pale hairs of unequal length on the bold transverse veins; length 3.5 to 8 in.; breadth 1 to 2 in.; petiole 5 to 1.5 in. Panicle solitary, terminal, very narrow, bearing a few very short, almost sessile, 4- to 6-flowered umbels. Flowers on pedicels about half the length of the calyx-tube. Calyx-tube short, campanulate, pubescent; the mouth wide and with 4 short, triangular, acute, spreading teeth alternating with tufts of hair. Petals 4, narrowly oblong, spreading. Stamens 8, equal; anthers slightly lobed at the base, inappendiculate. Ovary 4-ridged, 4-celled; ovules numerous. Capsule sub-globular.

BORNEO; Sarawak, Hullett 257.

A species resembling A. anisophyllus, Stapf, in the shape of its leaves. The inflorescence is however very different; and in its short subsessile panicle recalls to one's memory A. Beccarianus, from which its leaves distinguish it at once.

## 8. Sonerila, Roxb.

Low herbs, rarely half-shrubs. Leaves membranous or more or less fleshy, opposite, those of a pair similar in shape, although often very different in size, or distinctly heteromorphous and then often apparently alternate, usually more or less oblique, 3-7-nerved from the base or near the base, rarely pinnate-nerved. Flowers pink or white, in scorpioid simple or pseudo-umbellate cymes, 3 nerved. Calyx subcylindrical, turbinate or campanulate, 3-lobed or 3-toothed. Petals ovate, obovate or oblong, acute, acuminate or obtuse. Stamens 3, equal, rarely 6 and slightly unequal; anthers linear, oblong or lanceolate, obtuse, acute or (often long) acuminate, minutely 2-lobed at the base, without appendages, dehiscing with apical pores. Ovary attached to the calyxtube by narrow longitudinal septa, depressed at the apex, 3-celled; style filiform; stigma punctate or capitellate. Fruit enclosed in the persistent, ultimately spongy calyx-tube and forming with it a usually more or less trigonous, subcylindrical, turbinate or hemispherical false capsule, dehiscing from the centre of the depressed top with 3 valves or 6 fine teeth. Seeds minute, numerous, ovoid, pyramidal or clavate, smooth or asperulous; raphe usually thick, spongy. Species over 100 throughout tropical Asia.

Leaves similar, although often very unequal in size. Stamens 3. Fruit usually smooth (see No. 12-14); valves entire, distinct, exceeding the margin of the mature calvx (§ Eu-Sonerila) :-

Erect or ascending herbs with fibrous roots and without rhizome :-

Calyx very slender (also in fruit); stem with 2 somewhat raised, commissural lines. Very scantily hairy or glabrous, often much branched and small- or narrow-leaved (except No. 1) herbs :-

Leaves ovate, 1-1.7 in. by '7-'9 in. Leaves much smaller or at least very much narrower :-

Anthers '12-'18 in. long:-

Leaves oblong to elliptic-oblong, 3-5 by ·15--23 in. ... ••• ...

Leaves lanceolate, 1-1.75 in. by 15-23 in. ... 3. S. hyssopifolia. Anthers '06-'09 in. long •••

Calyx more or less oblong- or ovoid-campanulate; fruit turbinate or obpyramidal. Stem terete or quadrangular :--

Leaves more or less ovate, long acuminate, 1-2 in. by '4-1 in. or still smaller, acutely and coarsely toothed, thin, 3-5-nerved from the very base : petioles long, very slender ... Leaves usually larger, not coarsely toothed :-

Upper side-nerves starting from above the base:-Leaves pinnatinerved, acute or acuminate at the base ... ... Leaves not pinnatinerved (rarely subpinnati-

nerved in No. 7); all the side-nerves springing from near the base, rarely the uppermost from near the middle :-

Cymes distinctly peduncled:-

Anthers subacute, '09-'12 in. long; leaves membranous, rounded or subcordate at ... \*\*\*

Anthers slender, acuminate, '2-'3 in, long:-Stem, petioles and inflorescence minutely tomentose; leaves thinly membranous, subcordate at the base on very long and slender petioles ... \*\*\* Stem, petioles and inflorescence with long hairs; leaves acute or rounded, but not subcordate at the base :-

Leaves membranous, more or less oblong, usually acute at the base ... 9. S. pallida.

1. S. epilobioides.

... 2. S. calaminthifolia.

... 4. S. crecta.

... 5. S. tenuifolia.

... 6. S. flaccida.

... 7. S. andamanensis.

... 8. S. populifolia.

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Leaves somewhat fleshy, rounded at
                 the base :-
                   Hairs more or less spreading, often
                   very long, particularly on the
                   petioles and near the leaf margins;
                   leaves light-brown beneath
                                                    ... 10. 8. rudis.
                   Hairs adpressed, very soft; leaves
                   glaucous beneath with rufous hairs 11. S. mollis.
         Cymes
                 sessile.
                          reduced
                                    to few-flowered
        fascicles :--
           Unbranched or almost unbranched herbs :-
             Leaves fleshy, very dark and glabrous
             above, glaucous or pale-brown with rufous
             nerves beneath; calyx with scattered
             gland-tipped bairs
                                                    ... 12. S. albiflora.
             Leaves membranous, more or less covered
             on both sides with rufous flexuous hairs;
             calyx densely hirsute
                                                  ... 13. S. lasiantha.
          Suffrutescent, much branched ...
                                                   ... 14. S. suffruticosa.
    All the nerves springing from the very base of the
    leaf; adult leaves quite glabrous, broadly elliptic,
                                                    ... 15. S. elliptica.
Herbs with short stems, springing from a creeping rhi-
zome and with usually crowded to rosulate leaves and
terminal or subterminal pedancled cymes :-
  Leaves 3-7 in. by 2-4 in., 7-nerved from the very base
 with conspicuous subhorizontal transverse veins:-
    Stem, petioles and peduncles very succulent, stout 16. S. succulenta.
    Stem, petioles and peduncles usually slender ... 17. S. repens.
 Leaves small; uppermost side-nerves springing from
 above the base; transverse veins indistinct or 0:-
    Leaves oblong to lanceolate-oblong, 2-3.7 in. by
    ·3-1·4 in., pinnatinerved ...
                                       ***
                                                   ... 18. S. muscicola.
    Leaves much smaller, not or very indistinctly
    pinnatinerved, lateral nerves springing from below
    the middle :-
      Leaves oblong-lanceolate to lanceolate, acute at
      both ends
                                                   ... 19. S. saxosa.
    Leaves ovate to elliptic or oblong, rounded or sub-
    cordate at the base :-
      Stem 1-3 in. long; leaves broad, crowded, in
      about 3 pairs; petioles 3-7 in. long:-
        Leaves entire, not ciliate; 9-17 in. by 6-12
        in.; petals 35 in. long; anthers 15-2 in. long
        Leaves toothed, ciliate, '4-'8 in. by '4-'6 in.;
                                                       20. S. congesta.
        petals '25 in. long; anthers '12-15 in. long ...
       Stem shorter; leaves narrower, more numerous,
                                                       21. S. Griffithii.
      subrosulate; 8-14 in. by 4-6 in., often beauti-
       fully variegated; petioles up to 1 in. long,
       very slender
                                                        22. S. Cyclaminella.
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Leaves of each pair similar in shape, but very unequal in size or one quite suppressed. Stamens 6. Fruit as in Eu-Sonerila (§ Sonerilopsis, Miq.) .... Leaves of each pair very dissimilar in shape and size, one very small and more or less rotundate or reniform-cordate, often deciduous. Cymes usually from the axils of the small leaves, hence often apparently leaf-opposed. Anthers 3, oblong, obtuse, not over 15 in. long. Fruit more or less turbinate or semiglobose, obscurely trigonous, usually conspicuously muricate; valves not or very slightly exceeding the margin of the mature calyx, often not or indistinctly separating from each other at the periphery, but each of them always splitting into 2 membranous teeth in the depressed centre of the fruit. (§ Hexodon, Stapf):—

Cymes distinctly, densely and persistently bracteate, distinctly and often long peduncled:—

Cymes simple or 2 or more, sessile on a common peduncle, forming a dense head:—

Cymes simple, at length 1-15 in. long; leaves obliquely oblanceolate to obovate-oblong, 3-7 in. by 1-15 in.:—

Leaves fleshy, glabrous with the exception of the minutely strigillose nerves of the underside ... Leaves membranous, with rather long and spreading hairs beneath and along the margins ...

Cymes usually 2 or more, sessile on a common peduncle, very short, gathered in a dense head; leaves obliquely obovate, elliptic or oblong, 4-6 in. by 1.75-3 in. ...

Cymes usually 2 or more on a common peduncle, each with a special peduncle, gathered in a loose umbel; leaves obliquely elliptic, 3-5 in. by 1.75-2.75 in. ...

Cymes ebracteate, or indistinctly or deciduously bracteate:—
Cymes sessile or subsessile; peduncle, if any, less
than '5 in., when mature; fruit muricate:—

Cymes dense, indistinctly bracteate, sessile:—
Bracts linear, usually minute, or suppressed; calyx pubescent; leaves fleshy, firm when dry, glabrous above, shortly and adpressedly pubescent or tomentose beneath ... ...
Bracts filiform, ciliate, hidden among long spread-

Bracts filiform, ciliate, hidden among long spreading hairs; calyx shaggy; leaves membranous, very hairy on both sides ... ...

Cymes subsessile somewhat loose, ebracteate or deciduously bracteate:—

Leaves obliquely obovate-lanceolate to oblong, 2.5-6 in. by 1-2.5 in.:—

Leaves somewhat fleshy, firm, when dry with conspicuous transverse veins; pedicels very

23. S. heterostemon.

24. S. integrifelia.

25. S. bracteata.

26. S. capitata.

27. S. caesia.

28. S. Nidularia.

29. S. brachyantha.

slender, to '25 in. long; calyx with short, fine. spreading hairs; fruit '08-'1 in. long, finely muricate ... 30. S. microcarpa. ... ... Leaves membranous with conspicuous raised transverse veins; pedicels slender, '08-'12 in. long; calyx with long spreading hairs; fruit ·15-18 in. long, coarsely muricate ... 31. S. costulata. Leaves obliquely elliptic, 4-6 in. by 2.2-3.5 in.; 32. S. macrophylla. fruit '2 in. long Cymes distinctly, often long, peduncled :-Cymes 2 or more gathered in an umbel, or if simple, then with a pair of (often minute) leaves at the middle :-Calyx hairy; fruit muricate:-Cymes usually compound, minutely bracteate, axis shaggy; leaves more or less hairy all over 33. S. paradoxa. Cymes usually simple, deciduously bracteate; bracts small; axis shortly hairy; leaves glabrous (in the Peninsular specimens) with the exception of the very shortly and scantily hairy nerves and veins of the underside 34. S. begoniaefolia. Calyx glabrous; fruit smooth 35. S. glabriflora. Cymes simple, ebracteate; peduncle naked:-Softly hairy or tomentose all over :-Leaves oblong-elliptic or obovate, 2.2-2.8 in. by 1-1.2 in., petals '18 in. long ... 36. S. elatostemoides. Leaves oblong to lanceolate-oblong, 3-6 in. by 1-1.5 in.; petals '35 in. long 37. S. bicolor. Shortly tomentose on stem, petioles and peduncles and pubescent on the nerves on the underside of the leaves, otherwise glabrous; fruit smooth ... 38. S. Calycula.

1. Soneria epilobiodes, Stapf and King. An erect, sparingly branched, almost quite glabrous herb, about 6 in. high. Stem with 2 prominent very minutely hairy lines or quite glabrous. Leaves of each pair similar in shape and equal or almost equal in size, ovate, acute or subacute, acuminate at the base, minutely toothed, thinly membranous, green, glabrous or with few scattered, soft, adpressed hairs above, 1-1.75 in. long by '7-'9 in. broad, finely 5- (rarely 3-) nerved from the very base with a few delicate side nerves higher up; petiole '4-'5 in. long, slender. Cymes terminal, peduncled, rather loosely 5-6-flowered, glabrous; peduncle '6-'8 in. long, slender; pedicels at length up to '2 in. long, very slender. Calya very slender, obconical, '25-'3 in. long; teeth broad, triangular, mucronulate. Petals elliptic-oblong, acuminate-apiculate, '2 in. long, pink. Anthers subacute; '12 in. long. Style filiform, '12-'15 in. long; stigma subcapitate. Mature fruit unknown.

KEDAH; Santow, on the limestone islands, Curtis 2114!

Sonerila Calaminthifolia, Stapf and King. An ascending or almost prostrate branched herb, from a few inches to 1 ft. high, with very minute, spreading hairs all round or along the 2 commissural lines of the stem and branches, or glabrescent below and with scattered, adpressed, short, straight or flexuous hairs on the upper side of the leaves. Stem terete below, quadrangular in the upper part, purple, like the branches slender and often flexuous. Leaves petioled, rarely the uppermost subsessile and then sometimes apparently whorled, those of a pair similar in shape and size, symmetrical, oblong to elliptic-oblong, subobtuse, narrowed into the petiole, acutely toothed with the teeth usually mucronate and the margin revolute, rather stoutly membranous or almost fleshy, pale-green, purple along the midrib, 3-5 in. by 15-23 in., 1-nerved or with 1 very fine side-nerve on each side from near the base; petioles '08-12 in. or less. Cymes terminal, 2-5-flowered, ultimately lax or flowers solitary; peduncles filiform, 4-8 in. long; pedicels very slender, about '08 in. long. Calyx slender, obconical-oblong, '15-2 in. long; teeth triangular, broad, acute. Petals elliptic, cuspidate, about ·33 in. long, pink. Anthers shortly acuminate, ·12-·17 in. long. Style filiform, '2 in. long; stigma punctiform. Fruit oblong, subtrigonous, smooth, 25-3 in. by 08-1 in.

PERAK; Gunong Batu Pateh, 4300 ft., Wray 1022!

3. Sonerila Hyssopifolia, Stapf and King. An erect, simple or branched herb, 6-9 in. high, with two lines of short, curled hairs on the stem and branches, and with whitish, flexuous, longer hairs on the upper side of the leaves. Stem subterete below, quadrangular above. Leaves sessile or petioled, those of a pair similar in shape and size, lanceolate, subacute, cuneate at the base or the uppermost sessile and rounded at the base, symmetrical, minutely and somewhat remotely toothed with very acute or mucronate teeth, membranous, green, pale below, 1-1.75 in. by 15-3 in., indistinctly 3-nerved from near the base; petioles very variable in length, up to '4 in. long, or 0. Cumes few-flowered. at length lax; peduncles '8-1 in. long, very slender, pedicels very slender, 04-08 in. long. Calyx very slender, almost cylindric, ·24-·28 in. by ·04 in.; teeth triangular, mucronulate. Petals ellipticoblong, acute, 27 in. long, pink. Anthers acuminate, 12-18 in. long. Style filiform, about 18 in. long; stigma subcapitate. Fruit trigonouscylindric, slightly obconical at the base, 5 in. by almost 1 in.

Perak; Gunong Hijan; Scortechini 1426!

4. Soneria erecta, Jack in Malay Misc. I, 7. A copiously branched herb, 1-1.5 ft. high, more or less hairy with the exception of the inflorescence, hairs flexuous, finely pointed, those of the stem and branches short, along 2 lines, those of the leaves longer, whitish, all over both surfaces. Stem subterete below, quadrangular above,

branched all along, branches more or less divaricate, 1 or, in luxuriant specimens, 2 from each leaf axil; often branched again. Leaves sessile or petioled, often apparently whorled on the upper or, in vigorous specimens, almost on all nodes, those of a pair similar in shape and size, lanceolate or ovate, acute or subacute, contracted or subcuneate at the base, rather symmetrical, entire or minutely toothed, membranous, green or greyish when very hairy, 4-1.2 in. by 2-4 in., indistinctly 3-nerved from near the base; petioles slender, very variable in length, up to 3 in, long, or 0. Cymes 2-9-flowered, at length very lax; peduncles filiform, '4-2 in. long; pedicels very slender, '04 in. long or hardly any. Calyx very slender, almost cylindric, 15-2 in. by 03 in., teeth triangular, short. Petals elliptic-oblong, cuspidate-acuminate, '15 in. long, pink. Anthers ovate-lanceolate, acute or subacute. 06-09 in. long. Style filiform, 12 in. long; stigma punctiform. Fruit almost cylindric, slightly trigonous, smooth, 3-45 in. by 06-08 in. Jack in Hook. Bot. Misc. II, 63; Blume in Flora (1831), 491; Benn. Pl. Jav. Rar. 217; Naud. in Ann. Sc. Nat. Ser. 3, XV, 324; Miq. Fl. Ind. Bat. I. 563; Triana in Trans. Linn. Soc. XXVIII, 75; C. B. Clarke in Hook, f. Fl. Brit. Ind. II, 530; Cogn. in DC, Monogr. VII, 492; Stapf in Ann. Bot. VI, 304.

PENANG; Government Hill, Curtis, Porter in Wall. Cat. 4092; Maingay 2214 (778, Kew Distrib.). DISTRIB. Northwards as far as Moulmein.

Var. flexuosa, Stapf and King. Stems ascending, like the very slender branches more or less flexuous. Leaves lanceolate to linear-lanceolate, acuminate at the base, '4-8 in. by '12-2 in., more or less pubescent or scaberulous from very short hairs, mainly above, margins usually finely but sharply toothed and often revolute. Cymes 3-1-flowered with capillary peduncles. Fruit '27-35 in. long, by '6-8 in.

PENANG; on rocks, 2000 ft., Curtis 1238! PERAK; Larut, on rocks in rich, moist soil, 300 to 600 ft., Kunstler 2364! Scortechini 91!

VAR. discolor, Stapf and King. Stems ascending or erect, branches very slender, slightly flexuous, very minutely hairy along lines or almost glabrous. Leaves oblong-lanceolate to ovate-lanceolate, minutely toothed, narrowly revolute on the margins, very pale beneath, 3-5-nerved near the base, nerves fine, but rather distinct. Cymes 4-1-flowered, rather congested, also when mature. Anthers 08-09 in. Fruit oblong-cylindric, ·3-35 in. by 08 in.

PERAK; Scortechini 160!

5. Somerica tenuivolia, Blume in Flora 1831, 491. An erect or ascending, branched or unbranched herb, 6-12 in high, usually with scattered, spreading, gland-tipped hairs in the upper part of the stem, on the peduncles and pedicels, and near the mouth of the calyx and with few

adpressed, finely attenuated, pale hairs on the upperside of the blades. rarely almost quite glabrous. Stem slender, terete below, more or less quadrangular upwards. Leaves of a pair similar in shape, but unequal in size, ovate to ovate-lanceolate, long acuminate, symmetrical or slightly asymmetrical and rounded at the base, acutely and coarsely toothed, thinly membranous, dark- or pale-green, the larger 1-2 in. by '4-1 in., distinctly 3-, rarely 4-5-nerved from the very base, very faintly pinnate-nerved higher up; petioles very slender, reaching 1.5 in. in length, purple. Cymes 1-6-flowered, almost pseudo-umbellate; peduncle :5-1 in. long, like the slender pedicels purple or crimson, the latter 25-3 in. long. Calyx campanulate-oblong to ovoid-oblong, about '15 in. long; teeth distinct, triangular. Petals elliptic, apiculate, 3-35 in. long, glabrous, rose-coloured. Anthers lanceolate-acuminate, acute or subobtuse, 12-13 in. long. Stigma capitate. Fruit trigonous, obconical, ·23-27 in. long, smooth; valves ·23 in. broad. Benn. Pl. Jav. Rar. 211, t. 44; Naud. in Ann. Sc. Nat. ser. 3, XV, 324; Miq. Fl. Ind. Bat. I, 563. Triana in Trans. Linn. Soc. XXVIII, 76; C. B. Clarke in Hook. f. Fl. Brit. Ind. VIII, 536. Stapf in Trans. Linn. Soc. 2nd Ser. IV, 156; Cogn. in DC. Monogr. VII, 502; Stapf in Ann. Bot. VI, 301.

PERAK; Scortechini 312! Kunstler 722! Wray 427! on Gunong Batu, 4500 ft., Wray 273! 406. MALACCA; Mt. Ophir, Maingay 2582! DISTRIB. Sumatra, Java, Borneo.

VAR. hirsuta, Stapf and King. Leaves hairy on both sides; hairs copious at least above, longer, wavy or curled, less adpressed than in the type; blades often very small (0.6 in. by 0.3 in.); flowers solitary.

PERAK; Scortechini 790! Larut, top of Gunong Bubu, 5000-5300 ft., Kunstler 7406! Wray 3841!

6. Sonerila flaccida, Stapf and King. An erect or ascending, usually branched herb, 5-1 ft. high, with a very fine, furfuraceous, dark rusty and often scanty indumentum in the lower part and on the underside of the leaves (at least on the nerves), otherwise glabrous. Stem quadrangular. Leaves of a pair similar, equal or unequal in size, oblong or oblong-elliptic, subacute or subacuminate at both ends, or the tips obtuse, sometimes decurrent at the base, entire or nearly so, symmetrical or more or less asymmetrical, thinly membranous, dark- or light-green and often spotted with white circular or elliptic spots above, whitish green beneath, 2-4 in. by '75-1'75 in., pinnate-nerved, distinct side-nerves usually 3 on each side, the others like the tertiary nerves very faint or quite obscure; petiole up to 6 in. long, often very short, slender. Cymes terminal and axillary, short, few- to 9-flowered, peduncled, peduncle very slender, '75-1 in. long; pedicels very slender, '08-15 in. long. Calyx slender, obconical to oblong, 13-15 in. long, rose-coloured, teeth triangular, very short and broad. Petals oblong, acute, '15 in.

long, rose-coloured. Anthers acute, '12 in long. Style filiform; stigma capitate. Fruit trigonous, truncate-obovate, '2 in long, smooth; valves '12 in broad.

Perak; Gunong Panti, 600-800 ft., Kunstler 219! Ridley 4184! Gunong Inas, 3500 ft., Wray 4066! 4067!

Certain small specimens, collected by Scortechini in Perak (272), represent only a dwarf state of S. flaccida; their larger leaves measure 1-15 in. by 6-8 in.

SONERILA ANDAMANENSIS, Stapf and King. An erect or ascending, branched or unbranched herb, 3-6 in. high, more or less hirsute, particularly on the stem and petioles, with flexuous, finely pointed hairs. Stem reddish-brown when dry, quadrangular. Leaves rather approximate, those of a pair similar in shape and size, or more or less unequal. ovate to ovate-oblong, acute or subacuminate, rounded or subcordate and often slightly asymmetrical at the base, membranous, green or purple above, purplish glaucous below, length 1.5 to 3.3 in., breadth 1 to 1.7 in., 5-8-nerved from below the middle, the lower nerves more or less opposite, the uppermost 1 or 2 usually alternate, transverse veins oblique, fine or obscure; peduncle :5-1:5 in. long. Cymes few- to manyflowered, much contracted, peduncles solitary and terminal, or 2-4 from the top and the uppermost leaf-axils, 1-2 in. long; pedicels slender, up to 1 in, long, like the flowers with scanty and sometimes minutely glandtipped hairs. Calyx very slender, obconical, up to 2 in. long; teeth short, broad, triangular. Petals elliptic, acuminate, 25 in. long, rosecoloured. Anthers ovate-lanceolate, subacute, '09-12 in. long. Style filiform, 2-25 in. long; stigma capitate. Fruit oblong with a cuneate base. 22-27 in. long, smooth; valves scarcely 1 in. broad.

Andamans; Mount Harriet near Port Blair, on rocks, King's Collector 48!

8. Soneria populifolia, Stapf and King. An erect or ascending, simple or sparingly branched herb, 6-9 in. high, more or less covered with minute hairs and with a few soft, adpressed, whitish, small bristles on the surface and the margins of the ultimately often glabrescent leaves, with the hairs of the inflorescence often minutely gland-tipped. Stem finely rusty-tomentose, subterete below, quadrangular above. Leaves of a pair similar in shape and equal or somewhat unequal in size, ovate, acute or acuminate, usually minutely cordate at the base, with the lobes often more or less unequal and close, subentire or toothed in the upper part, thinly membranous, light-green, 1.5-3 in. by 1.2-1.75 in., finely 7-nerved from near the base, upper pair .2-3 in. from the base; petioles very slender, 1-2 in. long, finely tomentose. Cymes fewto 12-flowered, much contracted and almost umbelliform, terminal; pedanole slender, .5-1.2 in. long; pedicols slender, .15-.22 in. long.

Calyx subcampanulate-oblong, '18-'2 in. long; teeth broad, triangular. Petals elliptic, shortly acuminate, '3-'4 in. long, deep- to blueish-pink. Anthers acuminate, tips sometimes very fine and curved, '2-'3 in. long. Style filiform, '35-'45 in. long; stigma minutely capitate. Fruit trigonous, truncate-obovoid, '2-'25 in. long, smooth, often finely puberulous; valves '15-'16 in. broad.

PERAK; Scortechini 136! 300-500 ft., King's Coll. 10055! Larut, dense jungle, 500-800 ft., King's Coll. 5791! Briah plains, Wray 4201! Tapah, Curtis!

The uppermost pair of leaves is often much reduced, resembling a pair of bracts. One of the leaves of the preceding pair is sometimes suppressed, whilst the peduncle and the petiole of the other leaf are so turned that the latter seems to form the continuation of the axis; hence the former appears to spring from a long petiole. This is chiefly the case with the inflorescences which terminate branches.

9. Sonerila Pallida, Stapf and King. An ascending, branched or unbranched herb, 6-12 in. high, hirsute all over, but chiefly on the stems and petioles, hairs pale reddish when dry, those of the inflorescence short, stiff and spreading. Stem decumbent at the base, rooting in the lower part, quadrangular. Leaves of a pair similar in shape, but usually rather unequal in size, oblong to ovate-oblong, acuminate, symmetrical or more or less asymmetrical and acute (rarely obtuse) at the base, minutely denticulate, membranous, light green, the larger 1.5-4 in. by 8-1.8 in., finely but distinctly 5-7-nerved from near the base, the upper pair 4-6 in from the base, petioles up to 6-75 in long. Cymes few- to 8-flowered, short, on apparently terminal peduncles; peduncles slender, 1-2 in. long; pedicels '08-15 in. long, slender. Calyx slender, trigonous, obconical-campanulate, 15-2 in. long; teeth distinct, triangular. Petals elliptic-oblong, apiculate, 45-5 in. long, with a line of short, stiff, spreading hairs on the back, pale pink. Anthers acuminate, slender, 23-24 in. long. Style filiform, stigma punctiform. Fruit trigonous, obconical, 25-3 in long, sparingly muricate, valves '15 in. broad.

PERAK; Gunong Inas, 5000 ft., Wray 4100! MALACCA; Bujong, Curtis 3155! Selangore; Bukit Hitam, 2500-3500 ft., Kelsall! Ridley 7320!

10. Sonerila rudis, Stapf and King. A semidecumbent, sparingly branched or unbranched herb, about 1 ft. high, densely clothed with short, or often very long, fine and spreading, curved or curled hairs on the stem and petioles, with somewhat coarse, more or less addressed hairs on both sides of the leaves and gland-tipped, spreading hairs on the peduncles, pedicels, calyx and the midrib of the petals, hairs reddish when dry. Stem often rooting in the lower part, terete or subquadrangular

in the upper part. Leaves of a pair similar, subequal or rather different in size, ovate to oblong or elliptic, acute or subacuminate, rounded at the base, entire, somewhat fleshy, green above, pale beneath, distinctly 7-nerved from near the base (upper pair '2-'25 in. above the base); petioles '4-1'2 in. long. Cymes 2-6-flowered, umbelliform, terminal, peduncled; peduncle slender, '5-1 in. long; pedicels '08-'1 in. long. Calyx rather slender, subcampanulate, '12-'15 in. long; teeth short, broad, triangular. Petals elliptic to obovoid, obtuse or subacute, '5-'6 in. by '35-'4 in., pink, with a line of gland-tipped hairs on the back. Anthers acuminate, slender, '23-'27 in. long. Style filiform; stigma punctiform. Fruit trigonous, shortly obconical, about '27 in. long, muricate, on stout muricate pedicels; valves '2 in. broad.

PERAK; Scortechini! Tumbung Parbat, Scortechini 422! Gunong Batu Pateh, 4500 ft., Wray 260. MALACCA; Bujong, Curtis 3297!

11. Sonerila Mollis, Stapf and King. An ascending, sparingly branched or unbranched herb, about 1 ft. high, densely and adpressedly tomentose along stem and petioles, and on the underside of the leaves along the nerves, and besides almost cobwebby on both sides of the young leaves; all the hairs soft and reddish when dry. Stem often rooting in the lower part, terete or subquadrangular in the upper part. Leaves of a pair similar, but differing more or less in size, elliptic to ovate-elliptic, shortly and acutely acuminate, rounded at the base, entire, somewhat fleshy, very dark green and quite glabrous above when adult, pale and glabrescent beneath between the nerves, the larger 2-3 in. by 1-2 in., distinctly 5-7-nerved from near the base (upper pair of side nerves 25-27 in., distant from the base); petioles 4-1 in. long. Cymes 2-4-flowered, umbelliform or flowers solitary, terminal, peduncled, glabrous; peduncle about 5 in. long, slender; pedicels ·2-·24 in. long, very slender. Calyx slender, subcampanulate, ·18-·2 in. long; teeth very short and broad, triangular. Petals elliptic-oblong, acute, '4 in. long. Anthers acuminate, '2-22 in. long. Style filiform; stigma punctiform. Fruit trigonous, shortly obconical, '24 in. long, smooth; valves 2-24 in. long.

Perak; Wray, Scortechini! Summit of Gunong Batu Patch, 6700 ft., Wray 375!

12. Sonerila albiflora, Stapf and King. An ascending or suberect, more or less branched herb, 9-12 in. high, densely and adpressedly hirsute along stem and petioles and more sparingly on the underside of the leaves, and with gland-tipped spreading hairs on pedicels, calyx and midrib of petals. Stem rather slender, terete or subquadrangular in the upper part. Leaves of a pair similar and rather equal in size, lanceolate to ovate- or obvate-lanceolate, acute or subacuminate at both ends, entire or almost so, fleshy, very dark green (almost black when

dry) and glabrous above, pale and adpressedly hairy beneath (at least on the nerves), 1-3 in. by '5-1'25 in., distinctly 3-5-nerved from near the base; petioles '2-4 in. long. Flowers axillary and terminal, solitary or paired; pedicels '1-'2 in. long, slender. Calya subcampanulate, ovoid, '1 in. long; teeth distinct, broadly triangular. Petals oblong, apiculate, '2 in. long, white, with a line of gland-tipped hairs beneath. Anthers oblong, obtuse, '08-1 in. long. Style slightly and gradually thickened upwards; stigma punctiform. Fruit trigonous, shortly obconical, '2 in. long, very scantily muriculate; valves '2 in. broad.

PERAK; Scortechini 1886! Gunong Kledang, 1000 ft., Curtis 3293! Ridley 9691! Goldham! Kinta in dense jungle, 3500-4000 ft., King's Collector 7169!

13. Soneria lasiantha, Stapf and King. An erect herb, 4-6 in. high, hirsute all over with flexuous, finely pointed, rufous hairs. Stem terete, with the hairs more or less adpressed. Leaves of a pair similar in shape, very unequal in size, obliquely lanceolate or subovate, acute, attenuated at the base, membranous, green above, pale beneath, the larger 1.5-3 in. by '6-'8 in., with 2-3 side-nerves in the broader and 1 in the narrow half, the uppermost '75-1 in. above the base; petiole slender, '3-'6 in. long. Fascicles few-flowered, terminal and axillary, subsessile; pedicels rather stout, '1-'15 in. long. Calyx obconical, densely hirsute, '15-'18 in. long. Petals oblong, cuspidate-acuminate, '12 in. long. Anthers oblong, subacute, '06 in. long. Style filiform, rather stout; stigma punctiform. Fruit broad, obconical, muricate, to '25 in. long; valves '18-'2 in. broad.

PERAK; Gunong Bubu, Wray 3863! (in part).

The specimen which we have here in view is so different in habit and in the size of the comparatively long pedancled leaves from the others bearing the same number in Wray's collection, but described under S. suffraticosa, that we believe ourselves justified in considering it for the present as a distinct species.

14. Sonerila suffruticosa, Stapf and King. An erect, repeatedly branched half-shrub, over 1 ft. high, shaggy all over from coarsely adpressed, crimson (reddish, when dry) hairs, or glabrescent at length at the base. Stem terete, woody below, hollow. Leaves mainly crowded near the tips of the branches, those of a pair similar in shape, but rather unequal in size, oblong to ovoid-oblong, acute, more or less asymmetrical or almost symmetrical and acute at the base, obscurely serrate or toothed, thickly membranous, dark green above, paler beneath, the larger 1-14 in. by 4-6 in., 3-5-nerved from near the base; petioles 25 in. long to very short. Flowers unknown (petals white according to Wray). Fruits axillary, solitary or in pairs on stout short pedicels, obconical, 2 in. long, strigose from tubercle-based hairs, or muricate from their persistent bases; valves 12 in. broad.

PERAK; Larut, Gunong Bubu, 5000 ft., Wray 3863! (in part).

SONERILA ELLIPTICA, Stapf and King. An erect or ascending, usually unbranched herb, 6-9 in. high, with a very fine, furfuraceous, darkrusty indumentum in the lower parts and on the young leaves, glabrous or soon glabrescent higher up. Stem somewhat stout and succulent, terete. Leaves of a pair similar in shape, slightly unequal or equal in size, broadly elliptic, rarely ovate or almost orbicular, very obtuse, usually symmetrical and rounded or subcordate at the base, minutely and inconspicuously toothed, thick, fleshy, dark-green, often mottled with white along the nerves above, waxy yellowish-green beneath, 1-2.5 in. by 75-2 in., distinctly 5-nerved from the very base, upper nerves usually quite indistinct; petioles 1-2 in. long. Cymes manyflowered, dense, axis at length up to '75 in. long; peduncle slender, 1-2.5 in. long, pedicels at length up to 2 in. long. Calyx obconical, trigonous, 12 in. long, glabrous, teeth distinct, broad, triangular. Petals oblong, apiculate, 2-23 long, glabrous, pinkish white. oblong, obtuse, scarcely '1 in. long. Stigma punctiform. trigonous, obconical, '15 in. long, smooth; valves '12 in. broad.

PERAK; Kinta, on limestone rocks, 500-800 ft., Kunstler 7037!

7225! Sungie Siput, Curtis 3156!

16. Sonerila succulenta, Stapf and King. A succulent, erect herb, quite glabrous with the exception of a very few gland-tipped hairs on the calyx. Stem stout, very short to 3 in. long, very fleshy. Leaves few, crowded, of a pair equal, symmetrical or almost so, long-petioled, elliptic to ovate-elliptic, rather long and acutely acuminate, rounded at the base or very slightly subcordate, entire, very thinly membranous when dry, 6-7 in. by 3-4 in., 7-nerved from the base, with lax, subhorizontal transverse nerves, petioles succulent, 2-4 in. long. terminal and axillary, 2-5 on a long common peduncle, subebracteate, rather few-flowered, very short and dense; common peduncle stout, 4-7 in. long; special peduncles 1 to over 3 in. long, bracts very minute, Calyx oblongsubulate, the lower soon deciduous; pedicels hardly any. campanulate, up to 25 in. long; teeth short, triangular. Petals oblong, cuspidate-acuminate, 18 in. long. Anthers long-acuminate, incurved, over 25 in. long. Style 35 in. long; stigma subcapitate. Fruit subtrigonous, obconical, smooth, up to 25 in. long; valves over 15 in. broad.

PERAK; Maxwell's Hill, 3000 ft., Scortechini 279!

17. Sonerila repens, Stapf and King. A herb with a long creeping rhizome and a very short succulent stem bearing 2-3 usually much approximated pairs of leaves, with few, whitish, more or less adpressed, papilliform hairs on both sides of the leaves and with very few, minute, gland-tipped hairs on the stems, petioles and inflorescences, or glabrous with the exception of the leaves. Leaves of a pair similar in shape, equal or, more usually, very unequal in size, ovate, rarely oblong, acutely acuminate, cordate, rounded or rarely subacute at the base, rather symmetrical, entire or slighty wavy and denticulate, thinly membranous, dark- or pale-green, the larger 3-7 in. by 2-45 in., distinctly 7-nerved from the very base, with somewhat distant transverse veins; petioles 1-2.5 in. long, slender or stout, fleshy. Cymes long-peduncled, often many-flowered, solitary or usually 2-4 on a common subterminal peduncle from the leaf axils or close to the top; peduncle 2-5 in. long, first slender, at length rather stout, pedicels slender, 1-12 in. long. Calyx slender, obconical-campanulate, 2 to 23 in. long; teeth triangular. Petals elliptic, acute, 2-25 in. long, white or greenish white. Anthers slender, acuminate, 23-27 in. long. Style filiform; stigma punctiform. Fruit trigonous, obconical with straight sides, 22-3 in. long, smooth; valves 15-16 in. long.

Perak; 2000-4000 ft., common, Curtis 2015! Scortechini 1911! Maxwell's Hill, Scortechini 18/a! Ridley! Larut, on rocks in dense jungle, 2000 ft., Kunstler 2005! in open jungle on hill sides, 500-800 ft., King's Collector 5152! Kinta, Curtis! MALACCA; Bujong, 3000 ft.,

Curtis!

18. Sonerila Muscicola, Stapf and King. A flaceid, ascending, unbranched herb, 4-6 in. high, with a creeping rhizome, with pale, fine, curved or curled hairs in the upper part of the stem and the leaves, and with scanty, gland-tipped hairs on the pedicels, calyx and on the back of the petals. Stem slender, weak, quadrangular. Leaves of a pair similar in shape and size, oblong to lauceolate-oblong, subacute or subacuminate at both ends, symmetrical or almost so, minutely toothed or almost entire, thinly membranous, pale-green, 2-3.7 in. by '8-1.4 in., pinnatenerved, nerves 3-4 on each side, fine, very oblique; petiole 3-8 in. long. Cymes few-flowered, terminal, peduncled, umbelliform, peduncles very slender, 1-1.5 in. long; pedicels very slender, '08-12 in. long. Calya slender, obconical-campanulate, 2 in. long; teeth triangular, broad. Petals elliptic, apiculate, 35-4 in. long, pink, with a few glandtipped hairs along the middle nerve beneath. Anthers very slender, acuminate, tips curved, 22-24 in. long. Style filiform; stigma punctiform. Fruit trigonous, truncate-obovoid, 2 in. long, smooth; valves ·12 in. broad.

Kedah; Gunong Raya, on mossy trees, Curtis 2573!

19. Sonerila Saxosa, Stapf and King. An erect, delicate herb, 2-4 in. high, scantily hairy with the exception of the glabrous flowers, hairs pale, flexuous with long, fine tips; with a slender, creeping rhizome. Stem very slender, quadrangular. Leaves in 3-4 pairs (of which the upper are rather close), those of a pair similar in shape and size, oblong-lanceolate to lanceolate, acute at both ends, rather symmetrical, finely toothed in the upper part or almost entire, membranous, green above, purplish beneath, 8-1.7 in. by 3-6 in., 5-7-nerved from below the middle; petiole 2-3 in. long. Cymes 4-7-flowered, much contracted, terminal; peduncles very slender, 5-1.5 in. long; pedicels very slender, 15 in. long, glabrous. Calyx very slender, linear-subcampanulate, 15 in. long, teeth broad, triangular. Petals elliptic, acuminate, cuspidate, 3-35 in. long, pink. Anthers acuminate, 19 in. long. Style filiform, 3 in. long; stigma punctiform. Fruit obconical, truncate, sides almost straight, passing into the thickened pedicel, 25 in. long; valves 12-15 in. broad.

PENANG; Government Hill, 2500 ft., on rocks in damp shady

ravines; Curtis!

20. Sonerila congesta, Stapf and King. An erect or suberect, rather delicate herb, 3-3.5 in. high, quite glabrous with the exception of an extremely scanty, furfuraceous, dark-rusty indumentum in the lower part; with a slender, creeping rhizome. Stem 1-1.5 in. long (exclusive of the peduncle), quadrangular. Leaves in about 3 crowded pairs, those of a pair similar in shape and size, broad, ovate to elliptic, obtuse or subobtuse, rounded or obscurely cordate at the base, rather symmetrical, subentire, thinly membranous, green, '9-1.7 in. by '6-1.2 in., 5-7-nerved from near the base, upper pair '4-6 in. from the base; petiole slender, '6-7 in. long. Cymes 4-9-flowered, contracted; peduncles slender, 1.2 in. long; pedicels slender, '12-15 in. long. Calyx slender, subcampanulate-oblong, '15 in. long; teeth triangular, short. Petals elliptic-oblong, cuspidate-acuminate, '35 in. long, pink. Anthers acuminate, '15-2 in. long. Style filiform, '25-3 in. long; stigma punctiform. Fruit (semi-mature) obovoid-oblong, '15 in. long.

KEDAH; Gunong Chinchang, Curtis 2572!

21. Sonerila Griffithi, C. B. Clarke in Hook. f. Fl. Brit. Ind. II, 539. An ascending, delicate herb, quite glabrous with the exception of the margins and sometimes the upper surface of the leaves; with a rather stout rhizome. Stems very slender, 2-3 in. long (exclusive of the paniele), rooting from the lower, soon leafless nodes, quadrangular. Leaves in 3-4, often crowded pairs, those of a pair similar in shape and size, broad, ovate to rotandate-elliptic, obtuse or subobtuse, obscurely cordate, rarely subobtuse at the base, rather symmetrical, toothed and ciliate on the margin, membranous, green, 4-8 in. by 4-6 in., 5-nerved from near the base, upper pair 1 in. from the base; petioles slender, 3-5 in. long. Cymes 2-3-flowered, much contracted, peduncles slender, 1-22 in. long; pedicels very slender, 1 in. long. Calyx slender, subcampanulate-oblong, 12 in. long; teeth triangular-ovate. Petals elliptic-oblong, cuspidate-acuminate, scarcely '25 in. long, pink. Anthers acuminate, 12-15 in. long. Style filiform, not quite '25 in. long; stigma

punctiform. Fruit truncate, obovoid-oblong, cuneate at the base when quite ripe, 19-23 in. long, obtusely trigonous. Cogn. in DC. Mon. VII, 513; Stapf in Ann. Bot. VI, 308.

Malacca; Mt. Ophir, on dripping places, Griffith 2300! Maingay 2583! Lobb 182.

22. Sonerila Cyclaminella, Stapf and King. A rather delicate. perfectly glabrous, almost acaulescent herb, with a creeping rhizome. Stem usually extremely short, quadrangular. Leaves in about 4 pairs. almost crowded into a rosette, those of a pair similar in shape and size. ovate to oblong-obtuse or subobtuse at both ends or subcordate at the base, rather symmetrical, undulate-crenulate or almost entire, membranous, light or dark brownish green above with silvery bands along the midrib and often also along the side, nerves more or less rich violet underneath, 8-1.4 in. by 4-6, distinctly although finely 5-7-nerved below the middle, often with I or 2 delicate side-nerves higher up: petioles slender, '4-1 in, long. Cymes 2-5-flowered, very much contracted; peduncles slender, 2-5 in. long, pedicels slender, '08-'l in. long. Calyx slender, subcampanulate-oblong, 12-15 in. long; teeth triangular, short. Petals elliptic, cuspidate-acuminate, scarcely 25 in. long, light pink. Anthers acuminate, 12 in. long. Style filiform, 25 in. long; stigma minutely subcapitate. Fruit truncate, obovoid, obtusely trigonous, 12-16 in. long.

Perak; on rocky hilltops, 800-1000 ft., King's Collector 10745! 10746! 10744 (in part)!

VAR. canescens, Stapf and King. Leaves more or less covered above with long, flexuous, white hairs; some of Ridley's specimens have leaves up to 3 in. by 1.2 in.

PERAK; with the type; King's Collector 10744 (in part)! SELANGORE; Bukit Kinta, 3000 ft., on rocks, Ridley 7318!

23. Sonerila heterostemona, Naud. in Ann. Sc. Nat. Ser. 3, XV, 326, t. XVIII, fig. 4. An erect or ascending, often branched herb, 5-2 ft. high, rarely quite dwarf, quite glabrous apart from an extremely fine, furfuraceous, rusty indumentum in the younger parts and occasionally, a few scattered, short, whitish hairs on the upper surface of the leaves. Stem somewhat stout, quadrangular. Leaves of a pair similar in shape, but usually very unequal or one arrested at a very early stage or quite suppressed, rarely both more or less equal, usually conspicuously asymmetrical, obliquely ovate, subacute or shortly acuminate, rounded or shortly narrowed at the base, minutely toothed, membranous, metallic green, often spotted above, purplish beneath on the nerves, 1.5-4.5 in. by 1-2.3 in., 5-6-nerved from the very base with fine, lax, more or less horizontal transverse veins; petioles very unequal in length, 5-2 in. long. Cymes axillary and terminal, much contracted

and compact, very many-flowered, distinctly bracteate, at length 1-2.5 in. long, peduncle '6-1'2 in. long; bracts spathulate or obovate, very obtuse, up to '2 in. long, persistent; pedicels hardly any. Calya short, obconical-oblong, '15-16 in. long; teeth obscure, very obtuse. Petals elliptic, obtuse, pink, '15 in. long. Stamens 6, 3 slightly curved, purple, '15 in. long, 3 straight or almost so, yellow, '12-15 in. long. Fruit subsessile, turbinate, '19-23 in. long; valves '19 in. broad. Miq. Fl. Ind. Bat. I, 565; Triana in Trans. Liun. Soc. XXVIII, 77; C. B. Clarke in Hook. f. Fl. Brit. Ind. II, 540. S. obliqua, Cogn. in DC. Monogr. VII, 515; and Stapf in Ann. Bot. VI, 310 (in part), not of Korth.

PERAK; Scortechini! Ipoh, Curtis 3158! Changkal Serdang, Wray 783! Larut, Scortechini 54/a! Goping, Kunstler 787! Tapa, Wray 1308. MALACCA; Griffith 2302! 2294! Maingay 1223! (782, Kew Distr. partly), Cuming 2349! Lobb 183! in dense forest between Jassing and Ayer Bombon, Maingay 1425! (782, Kew Distrib. partly). MALACCA; Batang, Holmberg 876! Ulu Gujah, Harvey! (dwarf specimens). SINGAPORE; Maingay 3098! (782, Kew Distrib. partly); Bukit Timah, Hullet 893! PAHANG; Tahan, Ridley! (dwarf specimens). DISTRIB. Sumatra to Borneo.

Sonerila integrifolia, Stapf in Ann. of Bot. VI, 312. An erect or ascending, simple or branched herb, 5-1.3 ft. high, rufously strigose on the stem, the petioles, the nerves on the underside of the leaves and the inflorescence, including the calyx, but exclusive of the bracts, hairs of the leaves very tightly adpressed, like those of the inflorescence very Stem rather robust, often swollen at the nodes, subflexuous, almost woody below. Leaves very dissimilar, the larger of a pair asymmetrical, rarely symmetrical, usually obliquely oblong-lanceolate to obovate-oblong, distinctly (sometimes long) acuminate, minutely cordate or acute at the base, entire, sometimes with slightly wavy margins, somewhat fleshy, soft, quite glabrous above, dark- or yellowish-green, 3-5 in. by 1-1.5 in., sub-5-nerved from near the base with the lowermost pair of nerves faint, and the uppermost (in the narrow half) 2-1.2 in. above the base, with fine oblique transverse veins; small leaves minute, ovate to rotundate, often cordate, sessile or shortly petioled. Cymes terminal and apparently leaf-opposed, peduncled, bracteate, few- to many-flowered, very dense, up to 1 in. long, peduncles very short to '5 in. long; rhachis often flexuous when long; bracts oblong to linear-lanceolate, fleshy, up to 12 in. long, often much smaller, sometimes extremely numerous and crowded; pedicels very short or 0. Calyx oblong-campanulate, nearly 1 in. long; teeth triangular, up to '04 in. long, acute. Petals oblong, acute, '15 in. long, white to pink. Anthers oblong, obtuse, almost 1 in. long. Style 2 in.

long; stigma punctiform. Fruit semiglobose-turbinate, 12-18 in. long and wide, bullate-muricate.

PERAK; Larut, 200-800 ft., Kunstler 1917! 2791! Changkal Serdang, Wray 755! Blauda Mobok, Wray 3954! Maxwell's Hill, Scortechini 16a! Hermitage, Curtis 1302! SELANGOR; Dusun Tua, Ridley 7334! Kwala Tampan Caves, Ridley 306!

VAR. acuminatissima, Stapf and King. Leaves mostly very long and finely acuminate, on the whole narrower and less asymmetric than in the type, margins often slightly wavy to remotely serrulate, not rarely with a row of white spots close to them. Petals white.

PERAK; Larut, 1800-4000 ft., in dense old jungle, Kunstler 2004! 2161!

25. Sonerila Bracteata, Stapf and King. An erect or ascending, unbranched or very scantily branched herb, 5-1.5 ft. high, softly and densely hirsute to tomentose from rufous, flexuous or curved, more or less spreading, fine hairs in all parts with the exception of the upper side of the leaves which is glabrous apart from scattered, adpressed, pale bristles. Stem rather stout below with swollen nodes, subflexuous, leafy part 2 to over 6 in. long. Leaves very dissimilar, the larger of a pair shortly petioled, somewhat asymmetrical, oblanceolate, long and finely acuminate, unequally cordate at the base with a small rounded lobe on the outer, and a still smaller or obscure lobe on the inner side, entire, ciliate along the margin, membranous, light-green, 3-7 in. by 1-1.7 in., 5-nerved from near the base (the uppermost nerve 5-1.5 in. above the base), with oblique, transverse veins; petioles '2 to '4 in. long; small leaves reniform, very minute or up to 3 in. in diam. Cymes terminal and axillary, long-peduncled, very dense, subcapitate at first, at length to 1.5 in. long, multibracteate, many-flowered; peduncle rather slender, up to 2 in. long; bracts linear, membranous, ciliate, up to 12 in. long; Calyx shortly oblong-campanulate, 07-08 in. pedicels very short. long; teeth lanceolate-triangular, about '04 in. long. Petals oblong, cuspidate-acuminate, white, '08 in. long, with a line of gland-tipped hairs on the back. Anthers short, oblong, obtuse, '06-'07 in long. Style 15 in. long; stigma punctiform. Fruit shortly turbinate, 15 in. long and wide, densely muricate.

Perak; Larut, in dense old jungle, 3200-3500 ft., Kunstler 2133!

Maxwell's Hill, Scortechini 12!

26. Sonerila Capitata, Stapf and King. An ascending, unbranched or scantily branched herb, 3-12 in. high, rufously strigillose on the stem, the petioles and the nerves on the underside of the leaves, and also in the cymes, and with few or very few scattered, short hairs on the upperside of the leaves. Stem prostrate at the base, stout, succulent, swollen at the nodes, leafy part up to 7 in. long. Leaves very dissimilar,

the larger of a pair petioled, asymmetrical, obliquely obovate, elliptic or oblong, abruptly contracted into a narrow acumen, unequally cordate at the base with a small rounded lobe (to 2 in. long) on the broader side and gradually narrowed on the inner side, entire, membranous, lightgreen, 4-6 in. by 1.75-3 in., 5-8-nerved from near the base, with 2-5 nerves in the broad, and 2 in the narrow half, with oblique, on both sides distinctly raised, transverse veins; petiole stout, 5-1.5 in. long, small leaves orbicular-reniform, acute, cordate, sessile, up to 4 in. in Cymes terminal and axillary, long-peduncled, capitate, very dense, bracteate, few- to many-flowered; peduncles rather slender, glabrescent in the upper part, bracts numerous, linear, up to 25 in. long; pedicels slender, 07-09 in. long. Calyx oblong, densely shaggy from short hairs, thickened below, '07-'09 in., teeth narrow, triangular, '04 in. long. Petals oblong, acuminate, white or pinkish, '12 in. long, with a line of short, thick hairs on the back. Anthers short, oblong, obtuse, ·1 in. long. Style filiform, ·1 in. long, stigma punctiform. semiglobose, densely muricate, '15 in. long and wide.

PERAK; Scortechini 1886! Gunong Batu Pateh, in dense jungle,

3000-4000 ft. Kunstler 8075! 4500 ft. Wray 222!

Sonerila Caesia, Stapf and King. An ascending or creeping, low herb, densely hairy on the stem, petioles and the nerves and veins on the underside of the leaves, less so in the inflorescence and with few or no hairs on the upperside of the leaves, hairs rufous, fine, straight and adpressed, particularly on the nerves, or more or less spreading on the petioles, coarse on the rhachis of the cyme and at the base of the umbels. Stem rather stout, prostrate below, leafy-part rarely more than '5 in. long. Leaves very dissimilar, the larger of a pair long-petioled, asymmetrical, obliquely elliptic, subacuminate or subobtuse, unequally cordate at the base with a large rounded lobe ('4-6 in. long) on the outer, and a minute or quite obscure lobe on the inner side, entire or subentire, sometimes ciliate along the margin, somewhat fleshy, blue-green above, pale, green beneath with reddish nerves and veins, 3-5 in. by 1.75-2.75 in., 6-7-nerved from near the base, 3-4 nerves in the outer (larger), 2 nerves in the inner (narrow) half, with subhorizontal or oblique transverse veins; petiole 1-35 in. long; small leaves minute, ovatecordate, shortly petioled, or suppressed. Oymes terminal and from the upper leaf-axils, usually 2-3 in peduncled umbels with small bracts at the base, bracteate, few-to very-many-flowered, very dense; common peduncle slender, 1-2.5 in. long; special peduncles 25-1 in. long; pedicels slender, '08-1 long; bracts oblong, obtuse, as long as or shorter than the pedicels, glabrous, persistent. Calya obconical-campanulate, 12 in. long, scabrid, crimson; teeth triangular, acute, distinct. Petals oblong, cuspidate-acuminate, 22 in. long, pale pink. Anthers short, oblong, obtuse, 1 in. long. Style 25 in. long; stigma punctiform. Fruit semiglobose, 15 in. long and wide, tubercled, tubercles rounded.

PERAK; Gunong Batu Pateh, 3,400 ft., Wray 1035! UPPER PERAK; 300 ft., Wray 3442! 3553!

28. Sonerila Nidularia, Stapf and King. An ascending, simple, rarely furcate herb, 3-8 in. high, densely rusty-tomentose on the stem, petioles and the nerves (rarely also between the nerves) on the underside of the leaves, pubescent in the inflorescence (including the calyx), otherwise glabrous; hairs fine, flexuous, short to very short and more or less adpressed or, in the upper part of the stem, sometimes longer and more or less spreading. Stem prostrate at the base, stout, straight or flexuous, rooting at the base, leafy part 1-5 in. long. Leaves very dissimilar, the larger of a pair shortly petioled, asymmetrical, obliquely oblong to obovate-oblong, subacuminate or subobtuse, unequally cordate at the base with a larger, rounded lobe (12-2 in. long) on the outer and a similar, but much smaller lobe on the inner side, entire, fleshy, rather firm, dark-green above, sometimes with a row of large white spots on each side of the midrib, 3-4.5 in. by 1-2 in., 5-nerved from near the base with oblique transverse veins, the outer nerve of the inner (narrow) side marginal and often indistinct; petiole stout, 15-6 in. long; small leaves sessile, reniform or orbicular, cordate, 2 in, or less in diam. Cymes terminal and axillary, sessile, minutely or obscurely bracteate, few-to many-flowered, much contracted; pedicels very short at first, ultimately up to 3 in. long, and stout. Calyx campanulate-oblong, 12-15 in. long; teeth triangular, acuminate, up to '06 in. long. Petals obovate-elliptic, cuspidate, almost '25 in. long. Anthers short, oblong, obtuse, '14 in. long. Style '25 in. long. stigma punctiform. Fruit shortly turbinate, subtrigonous, muricate, 25 in, long and wide.

PERAK; Scortechini 650! Larut, 1000-2000 ft., Kunstler 2345! on hills in open jungle, King's Coll. 5764! Gunong Haram (?), Scortechini 655! Waterloo, common, Curtis!

29. Sonerila brachyantha, Stapf and King. An ascending simple or scantily branched herb, 3-8 in. high, softly hirsute or shaggy all over, hairs dense and more or less spreading on the stem, the petioles and all parts of the inflorescence (inclusive of the calyx), looser on both sides of the blades, reddish, rather long and flexuous. Stem rather stout, subflexuous, leafy part 1-3 in. long, branches, if any, spreading, resembling the main stem. Leaves very dissimilar, the larger of a pair petioled or subsessile, more or less asymmetrical, obliquely ovate-lanceolate to oblong-lanceolate, acuminate, unequally cordate at the base with a rounded lobe (15-25 in. long) on the outer and a minute lobe on the inner side, entire, membranous, dark brownish-green above, reddish or

deep-red or violet beneath, 2-4 in. by 1-15 in., 5-nerved from near the base, with 3 side-nerves in the broad and 2 side-nerves in the narrow half, uppermost side-nerves sometimes .4-5 in. above the base, with indistinct oblique transverse veins; petioles usually short or very short, rarely up to 5 in. long; small leaves ovate-cordate, acute or reniform, 15 in. long and broad, on slender, short petioles. Cymes terminal and axillary, solitary or in fascicles of 2-3, subsessile, indistinctly bracteate, few- to many-flowered, very dense; peduncles very short, slender, with 2 petioled small leaflets at the base; rhachis shaggy, bracts finely filiform, ciliate, hidden among the hairs of the rhachis; pedicels very slender, about '1 in. long. Calyx campanulate-oblong, ·12-15 in. long, shaggy; teeth triangular-lauceolate, ·07 in. long. Petals oblong, subacute, subcrect, over 25 in. long, pinkish white or pink, with a line of hairs on the back. Anthers short, oblong, obtuse, ·1 in. long. Style over ·25 in. long; stigma punctiform. Fruit semiglobose-turbinate, muricate, 2 in. long and wide.

PERAK; Scortechini 1873! 1875! Goping, in dense jungle, Kunstler 434! 440! Larut, in dense jungle, 500-800 ft., King's Collector 5752! MALACCA; Kinta Gunong, 1000-1500 ft., on rocky places, King's Collector 7179! Gunong Inas, 5000 ft., Wray 4088.

Sonerila Microcarpa, Stapf and King. An ascending herb, 3-6 in. high, rusty-tomentose on the stem, petioles and the underside of the leaves, more coarsely hairy in the inflorescence (including the calves) from short, somewhat stiff and spreading, or soft and more adpressed (underside of the leaves) hairs, and besides with scattered, longer and stouter, flexuous hairs on the upper side of the leaves. Stem long, prostrate at the base, somewhat stout, straight or subflexuous, leafy part 2-4 in, long. Leaves very dissimilar, the larger of a pair shortly petioled, asymmetrical, obliquely obovate-lanceolate or oblanceolate, abruptly acuminate, unequally cordate at the base with a larger rounded lobe (1-2 in. long) on the outer, and a similar, but very minute or obscure lobe on the inner side, subentire or entire or obtusely serrulate, fleshy, rather firm, dark-green above, sometimes with numerous small white spots, 2.5-4 in. by 1-1.5 in., 4-5-nerved from near the base with oblique transverse veins, petiole .15-4 in. long; the small leaves sessile, reniform or orbicular, cordate, 2 in diam. Cymes terminal and from the upper axils, subsessile or shortly peduncled, ebracteate, few- to manyflowered, rather lax; peduncle very slender, if any, up to 5 in. long; pedicels filiform, up to '25 in. long. Calyx campanulate-ovoid, '12 in. by '08 in.; teeth triangular. Petals oblong, acute, almost '25 in. long, like the calyx pink. Anthers short, oblong, obtuse, '08-'l in. long. Style 25 in. long; stigma punctiform. Fruit pale pink, subtrigonous, turbinate, minutely muricate, '08-'11 in. long, '15 in. broad.

PERAK; Scortechini! Upper Perak, 300 ft., Wray 3445! 3446! 3621! 31. Sonerila Costulata, Stapf and King. An ascending, unbranched herb, a few inches high, densely hirsute or tomentose on the stem, the petioles and more or less also in the inflorescence, including the calyx; adpressedly strigillose on the nerves and veins on the underside of the leaves, and with scattered, often very few, stouter hairs on the upper side of the leaves, hairs rufous, those of the stem, petioles and inflorescence flexuous, more or less spreading. Stem prostrate below, subflexuous, leafy part rarely more than 1 in long. Leaves crowded, the larger of a pair petioled, more or less asymmetrical or the upper sometimes almost symmetrical, obliquely (if asymmetrical) obovateoblong or oblong, subacuminate, unequally cordate at the base with a rounded lobe (2 in. long) on the larger and a minute lobe on the narrower half, entire, ciliolate along the margin, membranous, dark green, 3-6 in. by 1.3-2.5 in., 6- or rarely 7-nerved from near the base with 3 (rarely 4) nerves in the broad and 2 in the narrow half, with oblique, conspicuously prominent, transverse veins on both sides; petiole stout, 3-5 in. long; small leaves ovate-cordate to reniform, minute or up to 33 in. long, on short petioles. Cymes terminal and in the apper axils, solitary or 2 on a common very short peduncle, ebracteate, few- or many-flowered, contracted; rhachis very slender; peduncles very short; pedicels slender, 08-12 in. long. Flowers unknown. Fruit semiglobose-turbinate, muricate, 15-18 in. long and wide.

PERAK (?); foot of Gunong Panti, Kunstler 220!

Rather closely allied to S. Beccariana, Cogn.; but this has on the whole narrower, more acuminate leaves and much larger fruits.

32. Sonerila Macrophylla, Stapf and King. An ascending simple herb, 3-5 in. high, softly hirsute or shaggy all over; hairs dense and more or less spreading on the stem, the petioles and all parts of the inflorescence (inclusive of the calyx), looser on both sides of the leaves, pale reddish, rather long and flexuous. Stem prostrate below. Leaves very dissimilar, the larger of a pair petioled, asymmetrical, obliquely elliptic, acuminate, unequally cordate at the base with a large, rounded lobe (4 in. long) on the outer and a much smaller lober on the inner side, entire or subentire, membranous, on both sides light-brown when dry, 4-6 in. by 2·2-3 in., about 7-nerved from near the base, with 4 nerves in the broad, 2 in the narrow half and with usually indistinct, fine, oblique, transverse veins, uppermost side-nerve 1-1.25 in. above the base; petiole stout, 5-1.2 in. long; small leaves ovate-cordate to reniform, up to 25 in. long, on short, slender petioles. Cymes terminal and in the upper axils, solitary or 2 or a common short peduncle, ebracteate, rather many-flowered, apparently very dense owing to the long interwoven hairs; rachis slender; common peduncle very short to '7 in. long, slender, with a pair of spathulate-lanceolate, petioled leaflets at the point of branching; special peduncles very short; pedicels very slender, up to '15 in. long. Calyx campanulate-oblong, about '14 in. long, very shaggy; teeth triangular-lanceolate, up to '06 in. long. Petals oblong, acute, subcrect, '3-35 in. long; stigma punctiform. Fruit semiglobose-turbinate, muricate, about '2 in. long and wide.

PERAK : Scortechini !

VAR. laxipilosa, Stapf and King. All parts loosely hairy with the hairs as in the type. Leaves up to 6 in. by 3.5 in., rather thinner. Common and special peduncles short or up to 3 in. long (together).

PERAK; Ipoh, Kinta, Curtis 3154! Pulau Butong, Curtis!

SONERILA PARADOXA, Naud. in Ann. Sc. Nat. Ser. 3, XV. 321. A low, creeping herb, softly hirsute or shaggy all over; hairs dense and more or less spreading on the stem, petioles and all parts of the inflorescence (including the calyx), looser on both sides of the blades, reddish. rather long and flexuous. Stem creeping, slender to rather stout, rooting, the leaf-bearing, terminal part rising rarely more than '5 in, above the ground. Leaves crowded, very dissimilar, the larger of a pair petioled. asymmetrical, obliquely oblong or elliptic, shortly acuminate, unequally cordate at the base, with a large rounded lobe (25-5 in. long) on the outer and a similar but much smaller lobe on the inner side, entire or subentire, membranous, soft, light-green, 3-6 in. by 1.2-2.5 in., 6-8 nerved from near the base (3-5 nerves in the broader half), with oblique curved transverse veins; petiole 4-2 in. long or the uppermost very short; small leaves rotundate-ovate or reniform, cordate, 08-4 in. in diam., on very slender petioles (.08-6 in. long). Gymes terminal and from the upper axils, solitary with a pair of small petioled leaflets at the middle of the peduncle, or in umbels of 2-4, ebracteate or inconspienously bracteate, few- to many-flowered, dense; common peduncle slender, usually 1-2 in. long; special peduncles much shorter; rhachis very shaggy; bracts linear to filiform, ciliate, short, usually hidden among the hairs of the rhachis or suppressed; pedicels '08-1 in. long, very slender. Catyx campanulate-oblong, about 15 in. long, shaggy; teeth short, triangular. Petals oblong, acute, subcrect, over '25 in. long, white. Anthers oblong, obtuse, 'l in. long. Style over '3 in. long; stigma punctiform. Fruit semiglobose-turbinate, '12-'15 in. long, '18 in. wide, muricate-tuberculate. S. moluccana, Jack. Misc. I, 8; Wall. Cat. 4089; Bean. Pl. Jav. Rar. 215, (p.p.); Blume, Mus. I, 10 (p.p.); Mig. Fl. Ind. Bat. I, 562 (p.p.); C. B. Clarke in Hook. f. Fl. Brit. Ind. II, 537 (p.p.); Triana in Trans. Linn. Soc. XXVIII, 77; Cogn. in DC. Monogr. VII, 508 (p.p.); Stapf in Ann. Bot. VI, 311, 312 (p.p.); and Roxb. Flor. Ind. I, 178?

PENANG; Wallich Cat. 4089! Griffith 2298! Maingay 780 (Kew Distrib.) in shady, damp places, 1500-3000 ft., Stoliczka, Hullet 196! King's Coll. 1284! Pulloh Bahang, Curtis 411! SINGAPORE (?); Lobb 325!

Roxburgh says of his S. moluccana, "Habitat in insulis Moluccanis." His description is extremely short and insufficient, and there does not seem to have been a specimen in his herbarium nor was it figured by him. It is very improbable that the plant he described was identical with the Penang plant, if he received it really from the Moluccas, as the distribution of most species of the section Hexadon is very local, and no specimens, referrable to S. paradoxa, have been discovered, so far, east of the Malay Peninsula. On the other hand, it is possible that Roxburgh meant S. malaccana instead of "S. moluccana" and insulis malaccanis for "ins. moluccanis," as the editors of his Flora Indica put it. There is at least nothing in his description which would contradict the assumption that his brief diagnosis was drawn up from the Penang plant. In view of this uncertainty we have preferred to follow Naudin and to consider Roxburgh's S. moluccana as a "species dubia" and adopt Naudin's name for the Penang plant.

34. Sonerila begoniaefolia, Blume in Flora (1831), 490. An ascending, usually unbranched herb, 2-6 in. high, moderately hairy with the exception of the often glabrous upper side of the leaves; hairs of the stem, petioles and the inflorescence rufous, flexuous, more or less spreading, of the leaves confined to the nerves and veins of the underside, often scanty, very short. Stem rather slender, rooting below. Leaves very dissimilar, the larger of each pair petioled, more or less asymmetrical, obliquely elliptic, subacuminate, unequally cordate at the base with a rounded lobe (2-3 in. long) on the outer and a much smaller on the inner side, entire or more or less obtusely serrulate, ciliolate, membranous, dark-green above, pale brown (when dry) beneath, 3-4 in. by 1.7-2.3 in., 6- sub-7-nerved from near the base (with 3-4 nerves in the broader half), with usually very conspicuous subhorizontal transverse veins; petiole 4-12 in. long; small leaves ovate to rotundate, acute, cordate, very small, distinctly petioled. Cymes terminal and axillary, peduncled, dense, at length up to 8 in. long, deciduously bracteate; peduncle slender, up to 1.5 in. long; bracts linear-oblong, ciliolate, up to 'l in. long, deciduous; pedicels '07-'l in. long. Calyx campanulate-oblong, teeth broad, triangular. ovate, acute. Anthers short, oblong, obtuse. Fruit shortly turbinate, ·18-22 in. long and wide, muricate-tuberculate, tubercles rather coarse. acute, mostly passing into short fine bristles. Korth. in Verh. Nat. Gesch. Bot. 248, t. 54; Naudin in Ann. Sc. Nat. Ser. 3, XV, 322; Triana in Trans. Linn. Soc. XXVIII, (1873), 77. S. moluccana, Benn. Pl. Jav., Rar. 215; Miq. Fl. Ind. Bat. I, 562; C. B. Clarke in Fl. Brit. Ind. I, 562; Cogn. in DC. Monogr. VII, 508; Stapf in Ann. Bot. VI, 312 (all references under S. moluccana, p.p.).

SINGAPORE; Bukit Tunat, Ridley 2005! Chanchukang, Ridley 422! Bukit Mandu, Ridley 2005/a! Johore; Gunong Panti, Ridley 4199! DISTRIB. Sumatra, Java, South Borneo.

There being no flowers with the specimens enumerated, they have been described from Korthals, l.c. The Sumatra specimens have leaves which are more or less hairy or bristly on the upper side and represent Blume's VAR. pilosiuscula of S. begoniaefolia (Blume, Mus. I. 11) or S. moluccana VAR. pilosiuscula Stapf, l.c. A specimen from South Borneo, collected by Motley, is almost glabrous on the upperside of the leaves.

Sonerila Glabriflora, Stapf and King. A creeping or ascending herb, a few inches high, with a long creeping rhizome, hairy on the stem, peduncles, petioles and the nerves on the underside of the leaves. otherwise glabrous; hairs reddish, straight, adpressed. Stem rather stout, slightly swollen at the nodes, frequently rooting, leafy part 1-4 in. long. Leaves very dissimilar, the larger of each pair petioled, asymmetric, obliquely elliptic, obtuse or subacute, unequally cordate at the base with a large, rounded lobe on the cuter and small or obscure one on the inner side, entire or obscurely and remotely toothed. fleshy, soft, dark glossy-green above, pale with purple nerves beneath, 3-6 in. by 2-3.5 in., with 3-5 lateral nerves in the outer and 2-3 in the inner half near the base and with rather lax subhorizontal transverse veins; petiole rather stout, 1-2.5 in. long, the small leaves sessile, reniform-cordate, '2-'25 in. in diam. Cymes terminal and axillary, usually 2- or 3-nate on a common peduncle ebracteate, many-flowered, rather dense, glabrous, when ripe up to 1.3 in. long, common peduncle 1-2 in., special peduncles :5-1.2 in. long, slender; pedicels very slender. ·1-12 in. long. Calya campanulate-ovoid, ·12-15 in. by ·06 in.; teeth very broad and short. Petals elliptic, acute, almost 25 in. long, white or tinged with pink. Anthers linear-oblong, obtuse, 12 in. long. Style 15 in. long; stigma punctiform. Fruit subtrigonous, hemispherical, quite smooth, 15-16 in. long and wide; valves in the depressed centre of the capsule 6, delicately membranous, fragile.

PERAK; Larut, in wet jungles, up to 100 ft., Kunstler 1955! 2128!

36. Sonerila elatostemoides, Stapf and King. An erect, ascending or creeping, unbranched or scantily branched herb, up to 6 in. high, softly tomentose in all parts, hairs rusty coloured, short, spreading and very dense on the stem and petioles, somewhat laxer in the inflorescence inclusive of the calyx, pale and longer on the leaves. Stem slender, subflexuous. Leaves very dissimilar, the larger of each pair petioled, asymmetrical, obliquely oblong-elliptic or obovate, acuminate, unequally cordate at the base with the outer lobe broad, rounded, up to 2 in. long and the inner similar but much smaller, entire, membranous, green

above, whitish green below, 2·2-2·8 in. by 1-1·2 in., 6-7-nerved from near the base (with 3-4 lateral nerves in the broad and 2 in the narrow half) with oblique transverse veins, nerves and veins not very distinct; petiole '18-4 in. long; small leaves reniform-cordate, subsessile, '15 in. in diam. Cymes terminal and axillary, long peduncled, few-flowered, not very dense, ebracteate; peduncle slender, '6-1 in. long; pedicels slender, '02 in. long. Calyx oblong-campanulate, '08 in. long, teeth short. Petals oblong, acute, '18 in. long, with a line of hairs on the back. Anthers short, oblong, obtuse, '09 in. long. Style '2 in. long; stigma punctiform. Fruit semiglobose, muricate, '12 in. long and wide.

PERAK; Gunong Bubu, Wray 3825!

37. Sonerila bicolor, Stapf and King. An ascending or subcreet, nearly always unbranched herb, 3-9 in. high, softly hairy all over. hairs pale, straight, fine, spreading except on the upper side of the leaves, very dense in the upper part of the stem, on the petioles and in the inflorescence inclusive of the calvx. Stem rather slender, subflexuous, slightly swollen at the nodes. Leaves very dissimilar, the larger of each pair more or less asymmetrical, shortly petioled, obliquely oblong to lanceolate-oblong, distinctly acuminate, unequally cordate at the base with a rounded lobe (to 4 in. long) on the outer, and a minute or obscure lobe on the inner side, ciliate along the margin, membranous, soft, dark green or magenta-red above with a light green band along the midrib, purple beneath, 3-6 in. by 1-1.5 in., finely 5-nerved from near the base (uppermost nerve from 4-6 in. above the base, with faint oblique transverse veins; petiole '2-'6 in. long; small leaves ovate to rotundate, cordate, shortly petioled, very small to 4 in. long. Cymes terminal and axillary, peduncled, loosely few- to 10-flowered, ebracteate; peduncle slender, 4-1.2 in. long; pedicels '1-2 in. long, slender, also when mature. Calyx oblong-subcampanulate, 12 in. long; teeth triangular, short. Petals ellipticoblong, acute, 35 in. long, pink. Anthers linear-obloug, subobtuse. ·12 in, long. Style ·35 in, long; stigma punctiform. Fruit semiglobose, 12-15 in. long and wide, muricate, opening with 6 thinly membranous teeth in the depressed centre or with 3, 2-toothed valves.

Perak; Ulu Salama, 500 ft., Wray 4159! Larut, in dense jungle, 500-800 ft., King's Coll. 5794! Tapa, Baldwin!

38. Sonerila Calveula, Stapf and King. An ascending or creeping herb, about 6 in. long, rusty tomentose on the stem, petioles and peduncles, and pubescent on the nerves on the underside of the leaves, otherwise glabrous; hairs short, curled or flexuous, loosely adpressed. Stem rather stout, straight, rooting in the lower part, leafy part about 4 in.

long. Leaves very dissimilar, the larger of each pair petioled, symmetrical, or almost so, lanceolate, gradually tapering towards both ends, entire, somewhat fleshy, pale-brown on both sides when dry, 3·5-5·5 in. by ·8-1·25 in., 5-nerved from the base (the outer nerves faint, submarginal) with faint oblique transverse veins; petiole ·35-4 in. long; small leaves reniform, cordate, very minute, ·05 in. in diam., or suppressed. Cymes terminal and from the upper axils, peduncled, fewflowered; peduncle filiform, ·4-5 in. long; pedicels fine, not spongy when mature, ·1-12 in. long. Flower unknown. Fruit semiglobose, smooth, ·08-1 in. by ·12 in., crowned by the ultimately deciduous calyx-margin the teeth of which are very broadly triangular and cuspidate.

PAHANG; Tahan River, Ridley 2237!

## 9. PHYLLAGATHIS, Blume.

Herbaceous small shrubs with very short stems. Leaves opposite (or the terminal leaf solitary), large, petioled, orbicular, or sub-orbicular, 7-9-nerved. Flowers in a peduncled dense head, purple. Calyx-tube campanulate, glabrous or with long bristles near the top, teeth 4 (rarely 3), acute, long-setose. Petals 4 (rarely 3), ovate, acute, glabrous. Stamens 8 (rarely 6), equal; anthers elongate, scarcely produced at the base, connective without appendage. Ovary adnate to the bottom of the calyx-tube, 4- (rarely 3-) celled, glabrous at the apex; style filiform; ovules very numerous, placentas large axile. Capsule broadly funnel-shaped, opening by 4 valves at the top. Seeds ellipsoid, somewhat obovoid, with glandular, hardly raised dots; raphe slightly excurrent along one side of the seed its whole length.—Distrib. Species 5; all Malayan.

Leaves oblanceolate ... ... ... ... ... 1. P. tuberculata.

Leaves more or less orbicular; peduncles of inflorescence many inches long and as long as or longer than the long petioles:—

Flowers in narrow, shortly branched panicles ... 2. P. Griffithii.

Flowers in terminal solitary ebracteate umbels:—

Peduncles glabrous ... ... 3. P. Scortechinii.

Peduncles hispid ... ... 4. P. hispida.

Flowers in bracteate umbels with peduncles 1 or 2 inches long ... ... 5. P. rotundifolia.

1. PHYLLAGATHIS TUBERCULATA, King, n. sp. Stem short, woody, erect, covered with small warts. Leaves two or three, membranous, oblanceolate, shortly acuminate, very gradually narrowed to the short hispid petiole, 7- to 9-nerved; upper surface glabrous except for a few

scattered stout bristles; lower surface coarsely strigose on the nerves, otherwise glabrous, the reticulations fine; length 10 to 16 in., breadth 3 to 6 in., petiole 0 to 1.5 in. Peduncles much shorter than the leaves, solitary or several from one axil, sparsely glandular-hairy, bearing at their apices a solitary, lax, involucrate, compound umbel; involucres oblong, obtuse, glabrous, 5 in. in length or shorter, those of the umbellules smaller; pedicels shorter than the calyx-tube. Flowers nearly '75 in. long. Calyx-tube rather widely cylindric, bearing (especially towards its base) numerous flat, shortly stalked, fleshy discoid glands; the teeth 4, short, shallow, wide, each crowned by a stalked gland. Petals longer than the calyx, oblong, much acuminate (forming a narrow cone in bud). Stamens 8; the filaments about one-fourth as long as the linear acuminate anthers. Ovary short, broad, truncate, deeply grooved and almost winged; style long, flattened, smooth. Capsule '3 in. in diam.

PERAK; Scortechini 1872. King's Collector 7233.

At once recognisable by the curiously glandular calyx.

2. PHYLLAGATHIS GRIFFITHII, King. A shrub with a very short stem and usually only a single pair of unequal leaves. Leaves coriaceous, sub-rotund, 7-nerved, apex obtuse, the base cordate, edges quite entire; both surfaces glabrous, the lower lepidote and slightly puberulous on the nerves; length 5 to 8 in., breadth 3.5 to 6.5 in., petiole 4 to 8 in. Panicle axillary, nearly as long as the leaves, bearing in its upper half a few very short few-flowered branches, the whole lepidote especially towards the apex. Flowers corymbose, on scaberulous pedicels, as long as the narrowly campanulate glandular-hairy calyx-tube: mouth of calyx truncate, slightly expanded, and minutely 4-toothed. Petals 4, quadrate. Stamens much exserted: anthers not so long as the glabrous filaments, narrow acuminate, much sagittate at the base, inappendiculate. Allomorphia Griffithii, Hook. MSS. Fl. Br. Ind. II, 527. Triana in Trans. Linn. Soc. XXVIII, 74, t. VI, fig. 66c; Cogn. in DC. Mon. Phan. VII, 467.

MALACCA: Griffith (K.D.) 2264/1. Maingay (K.D.) 775; Hullett. Perak; Scortechini 170; King's Collector 694. Selangore; Curtis 2333! Ridley 7317. Penang; Stolickza.

I have removed this from Allomorphia to Phyllagathis of which it has the flowers and habit.

3. PHYLLAGATHIS SCORTECHINII, King, n. sp. Stem woody below, shortly creeping above and subterete. Leaves on very long petioles, coriaceous, reniform-rotund, cordate, the apex minutely apiculate, stoutly 9-nerved; the transverse veins bold, glabrous on the upper surface, glandular-puberulous on the lower; length 5 to 10 in.; breadth

5 to 9 in.; petiole 4 to 9 in., stout. Peduncles solitary, longer and more slender than the petioles, bearing at the apex a single dense, ebracteate umbel. Flowers nearly 5 in. long to the apices of the stamens, their pedicels 25 in. long. Calyx-tube narrowly campanulate, not ribbed, glabrous, very minutely lepidote; the teeth 4, broad, rounded, shallow. Petals rotund-ovate, blunt, short. Stamens 8; the filaments about half as long as the linear acute anthers. Ovary grooved, short, broad; style as long as the anthers, cylindric, glabrous. Capsule about 2 in. in diam., truncate, the valves broad, truncate.

Perak; Scortechini 269; King's Collector 4287. Selangore; Ridley 7317.

This species is closely allied to P. Griffithii but differs notably in its solitary terminal umbels.

4. PHYLLAGATHIS HISPIDA, King, n. sp. Stem very short, woody, hispid. Leaves 2 or 3, sub-coriaceous, on long petioles, broadly ovate, cordate at the base, the apex abruptly and shortly acuminate, the edges with minute, sharp, sometimes unequal teeth, 7- to 11-nerved, the transverse nerves strong: upper surface glabrous, the lower uniformly covered with minute, scurfy pubescence, the main nerves with a few long, spreading, stout bristles; petiole densely shaggy near the base, more sparsely hispid upwards: length 5 to 10 in., breadth 3 to 7 in.; petioles varying from 4 to 12 in. Peduncle axillary, shorter than the leaves and more slender than the petioles, sparsely hispid; the umbel few-flowered, ebracteate. Flowers '75 in. long; their pedicels slender, hispid, longer than the calyx. Calyx-tube narrowly cylindric or cylindric-campanulate, nearly glabrous, or sparsely hispid; the mouth with 4 broad, shallow, blunt teeth. Petals broadly ovate, acute. Stamens 8; anthers not much longer than the filaments, broadly lobed and cordate at the base, and the connective with a short, narrowly cylindric basal protuberance behind. Ovary very short; style filiform. Capsule 2 in: across.

PERAK; Scortechini! Wray 1021, 1602, 3519. PAHANG; Ridley 2236.

5. Phyllagathis rotundifolia, Blume in Flora, 1831, 507. Stem creeping, obtusely 4-angled. Leaves unequal in the pairs, rotund or rotund-ovate and shortly apiculate; both surfaces, but especially the lower, minutely lepidote; main nerves 7 to 9, curved, radiating from the base, the transverse nerves bold, curved; petioles unequal, from 85 to 3.5 in. long, their interior surfaces covered with coarse black bristles; length 2 to 8 in.; breadth 1.5 to 6 in. Inflorescence 4- to 30-flowered; the involucres orbicular-ovate acuminate. Calyx-tube ribbed, minutely lepidote; the teeth triangular, broad at the base but with

elongate narrow apices bearing 2 or 3 bristles; filaments from one-fourth to one-half of the length of the linear stamens. Ovary 4-angled, the apex with a truncate cartilaginous rim. Korth. in Verh. Nat. Gesch. Bot. 252, t. 57; Naud. in Ann. Sc. Nat. Ser. 3, XXV, 332; Bot. Mag. t. 5282; Miq. Fl. Ind. Bat. I, 559; Triana Melast., tab. VI, fig. 73; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 541; Cogn. in DC. Mon. Phan. VII, 518. Melastoma rotundifolia, Jack in Trans. Linn. Soc. XIV, 11; DC. Prodr. III, 149.

MALACCA; Griffith, Maingay. Selangore; Ridley 7327. Perak; Scortechini, King's Collector, Wray. DISTRIB. Burma, Sumatra, Java; common.

Rather variable as to size of leaves and as to the number of bristles on their petioles. The teeth of the calyx also vary as to the length of the acuminate apex and as to the number of bristles.

### 10. MARUMIA, Blume.

Twining shrubs; branches cylindric, thickened at the nodes. Leaves opposite, short-petioled, coriaceous, cordate at the base, 3-nerved from the base besides two submarginal nerves, entire, stellate-tomentose Cymes axillary; flowers 3-5, large, pedicelled, purple or beneath. white. Calyx-tube narrowly campanulate, tomentose (and often bristly or stellate-hairy); lobes 4, deep, persistent. Petals 4. obovate. Stamens 8, unequal; anthers elongate, opening by a single pore: connective of the longer anthers carrying in front two long bristles and behind often one or two spurs or several twisted bristles. Ovarv at the base (or half its height) adnate to the calyx, 4-celled, denselv hairy at the apex; style filiform; ovules numerous, placentas axile. Berry ellipsoid, crowned by the calyx-limb. Seeds numerous, oblongellipsoid, with glandular scarcely raised dots, raphe slightly excurrent along the whole length of one side. - DISTRIB. Species 10, Malava. Borneo and the Philippines.

Calyx-tube without bristles ... ... ... ... ... 1. M. nemorosa.

Calyx-tube very bristly:—

Teeth of limb of calyx half as long as the tube, oblong, acute: upper surface of leaves not reticulate ... ... ... ... ... ... 2. M. rhodocarpa.

Teeth of limb of calyx one-fourth as long as the tube or less, broadly triangular, blunt; upper surface of leaves much reticulate ... ... ... 3. M. reticulata.

1. MARUMIA NEMOROSA, Blume in Flora XIV, (1831), 505. A straggling climber; all parts except the upper surfaces of the leaves, the petals, stamens and ovaries covered with dense rufous or pale stellate

tomentum, without bristles; the branches thickened and annulate at the nodes. Leaves sub-coriaceous, elliptic or oblong-lanceolate, slightly cordate at the base, the apex shortly acuminate or acute, 5-nerved (the lateral pair of nerves faint); upper surface glabrous; length 3 to 6 in.; breadth 1.35 to 2.75 in.; petiole '2 to '4 in. long. Flowers about 1.75 in. long (including the stamens), solitary or in pedunculate cymes of three from the axils of the leaves. Calyx-tube more or less narrowly campanulate, somewhat constricted below the limb; limb with 4 deep, triangular teeth. Petals broadly ovate, blunt, longer than the calyxtube, rose-coloured. Stamens 8, unequal; the anthers of all linear, curved; the longer with two narrow, curved filaments at the base in front, and several smaller behind; the four smaller with two smaller, equal filaments at the base in front only. Fruit succulent, oblong-ovoid, constricted below the permanent calyx-teeth, sometimes sub-tuberculate and always stellate-tomentose, about 1 in. long. Blume Mus. Bot. I, 33; Naud. in Ann. Sc. Nat. Ser. 3, XV, 279; Miq. Fl. Ind. Bat. I, pt. I, 533; Triana in Trans. Linn. Soc. XXVIII, 82; C. B. Clarke in Hook, fil. Fl. Br. Ind. II, 542; Cogn. in DC. Mon. Phan. VII, 549. M. affinis, Korth. in Verh. Nat. Gesch. Bot. 241, t. 60; Miq. 1.c. 533. Melastoma nemorosum, Jack in Trans. Linn. Soc. XIV, 8; DC. Prodr. III, 149; Wall. Cat. 4043.

In all the provinces except the Nicobar and Andaman Islands.

DISTRIB. Sumatra, Borneo.

2. MARUMIA RHODOCARPA, Cogn. in DC. Mon. Phan. VII, 550. A powerful climber; young branches, petioles, lower surfaces of leaves and calyx densely clothed with minute, pale, stellate tomentum intermixed with numerous stout, spreading, brown bristles, the nodes somewhat swollen and with transverse lines. Leaves sub-coriaceous, oblong, narrowed to the rounded, minutely cordate base, the apex shortly acuminate, 5-nerved (the lateral pair slender); upper surface glabrous; length 3.5 to 5 in.; breadth 1 to 2 in.; petiole '15 to '2 in. Flowers (including the stamens) nearly 1.5 in. long, in axillary, pedunculate cymes of three. Calyx-tube longer than the glabrous pedicel, narrowly campanulate, constricted below the limb; limb with 4 oblong. acute teeth half as long as the tube and like the latter bearing many long, curved bristles. Petals white, obovate. Stamens 8, unequal, all linear and acuminate: the four larger with two long. filiform appendages in front and several smaller behind: the four smaller with about 4 to 6 appendages. Fruit shortly ovoid, crowned by the large calyx-teeth, bristly, 4 in. in diam. Melastoma rhodocarpum, Wall. Cat., 4045. Marumia echinata, Naud. Ann. Sc. Nat. Ser. 3, XV, 280; Miq. Fl. Ind. Bat. I, pt. I, 534. M. seylanica, Triana (not of Blume) in Linn. Trans. XXVIII, 82, tab. VII, fig. 88b; C. B. Clarke in Fl. Br. Ind. II, 542.

SINGAPORE; Wallich; Anderson 68, 69; Hullett 125; Ridley 258; King's Collector 278. Malacca; Maingay (K.D.) 785; Cuming; Griffith (K.D.) 2270.

VAR. sub-glabrata, Cogn. l.c. 550. Leaves glabrous beneath except the nerves. M. zeylanica, C. B. Clarke (not of Blume), VAR. sub-glabrata, Hook. fil. Fl. Br. Ind. II, 542.

SINGAPORE; Anderson 64.

3. MARUMIA RETICULATA, Blume Mus. Bot. I, 34. Scandent; young branches, petioles, under surfaces of leaves and calyx densely clothed with rusty stellate, more or less deciduous hairs, the young branches, petioles and especially the calyx with stout spreading bristles intermixed; the nodes swollen and annulate. Leaves subcoriaceous, ovatelanceolate, 5-nerved (the lateral pair slender), minutely cordate at the base, the apex shortly acuminate; upper surface deeply reticulate, glabrous; length 2 to 3.5 in., breadth '8 to 1.5 in., petiole '1 to '2 in. Flowers 1.25 in, long (including the anthers), axillary, either solitary on pedicels as long as themselves or in pedunculate cymes of three; the middle flower being nearly sessile, the lateral pair on short pedicels. Calyx-tube densely hispid externally, the teeth 4, short, broadly triangular and blunt, tomentose on the inner surface. Petals ovate, sub-acute. glabrous. Stamens 8, the anthers somewhat unequal in length but all linear, curved and with two long appendages at the base in front. Fruit ovoid, (unripe) 5 in. in diam., crowned by the calyx-teeth. Miq. Fl. Ind. Bat. I, pt. I, p. 535; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 542; Cogn. in DC. Mon. Phan. VII, 551. M. stellulata, Korth. (not of Blume) Ver. Nat. Gesch. Bot. 243. M. oligantha, Naud. in Ann. Sc. Nat. Ser. 3, XV, 281; Miq. l.c. 534.

Malacca; Griffith (K.D.) 2269; Maingay 784. DISTRIB. Sumatra, Java.

# 11. DISSOCHÆTA, Blume.

Shrubs, usually twiners. Leaves opposite, petioled or nearly sessile, elliptic or oblong-lanceolate, rounded at the base, 5 nerved from the base (the two submarginal nerves slender), entire. Flowers in terminal, sometimes leafy panicles, purple or white, bracts large or small. Calyx-tube campanulate-cylindric or funnel-shaped, densely stellate-tomentose, pubescent or glabrous; limb obscurely 4-lobed or entirely truncate, more rarely distinctly 4-toothed, persistent. Petals 4. Stamens 8, unequal, 4 shorter sometimes wanting, connective of the 4 longer with 2 long bristles in front at the base. Ovary adnate to the

cályx, 4-celled, apex glabrous or densely hairy; style filiform; ovules very many, placentas axile. Berry ovoid or elliptic, crowned by the calyx-limb. Seeds elipsoid, flattened on the side of the raphe.—DISTRIB. Species 25; throughout Malaya to the Philippines.

Stamens 8 (four of them sometimes imperfect):-Young branches, under surfaces of leaves and panicles covered with persistent stellate-tomentum :-The stellate-tomentum not mixed with bristles: the nodes with transverse interpetioler lines:-Flowers 1.75 in, long 1. D. annulata. Flowers '75 in, long 2. D. punctulata. The stellate-tomentum mixed with spreading persistent bristles; flowers '75 in. long 3. D. hirsuta. Young branches, under surfaces of leaves and panicles covered at first with stellate-tomentum which ultimately more or less disappears :-Bracts of panicle obovate, persistent ... 4. D. bracteata. Bracts of paniele linear, decidnous 5. D. pallida. Young branches, under surfaces of leaves and panicles covered with minute simple scales not stellate 6. D. gracilis. Stamens 4 :-Panicles ebracteate, or bracts, if any, caducous :-Flowers '3 in. long; fruit '15 to '2 in. in diam.; mouth of calyx-tube 4-toothed; petals broadly oblong, blunt; stamens blunt, not appendiculate at the apex 7. D. celebica. Flowers '5 in. long; fruit '2 to '25 in, in diam. : mouth of calyx-tube truncate not toothed: petals ovate, acute; stamens narrowed to the appendiculate apex ... 8. D. intermedia. Panicles with persistent, oblong bracts :-Young branches at first rusty stellate-hairy, finally glabrous; branches of panicle divaricating, lax ... 9. D. anomala. Young branches with persistent, pale, adpressed, stellate hairs; branches of panicle condensed ... 10. D. Scortechinii.

1. DISSOCHETA ANNULATA, Hook. fil. ex Triana in Trans. Linn. Soc. XXVIII, 83. A strong climber; young branches, petioles, under surfaces of leaves and inflorescence covered with dense, rusty, deciduous stellate tomentum, the nodes thickened and slightly annulate. Leaves coriaceous, ovate-oblong, cordate at the base, the apices shortly and rather abruptly acuminate, upper surface at first sparsely stellate-hairy, ultimately glabrous, the nerves and reticulations bold; length 2 5 to 8 5 in.; breadth 1 to 1 8 in.; petiole 2 to 5 in. Panicle solitary terminal, much longer than the leaves, lax, the branches divaricating,

cymose, 1- to 3-flowered; bracts small, caducous. Flowers 1.5 in. long (including the stamens), pedicels much shorter than themselves. Calyx-tube narrowly campanulate or funnel-shaped, the mouth widened and with 4 blunt, triangular teeth, densely stellate-hairy outside. Petals obovate-oblong, blunt, reflexed. Stamens 8; curved, elongate-linear, acuminate, with two bristle-like appendages at the base in front, laciniate behind. Fruit ellipsoid, succulent, crowned by the enlarged teeth of the calyx-tube. C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 543; Cogn. in DC. Mon. Phan. VII, 557. Melastoma bracteatum, Wall. Cat. 4044 (in part).

Penang; Wallich 4044; Griffith (K.D.) 2268; Maingay (K.D.) 788; Curtis 740. Malacca; Wallich. Singapore; Hullet 213; Ridley 5187. Johore; King's Collector 224. Perak; Scortechini 235. Distrib. Borneo.

2. Dissocheta punctulata, Hook. fil. ex Triana in Linn. Trans. XXVIII, 83. Young branches thickened but not annulate, clothed like the petioles, under surfaces of the leaves and the inflorescence with minute, rusty scales. Leaves coriaceous, oblong-ovate, the base rounded and not cordate, the apex acute or very shortly acuminate; 5-nerved, the marginal nerves very slender; upper surface glabrous; length 3 to 4.5 in.; breadth .75 to 1.75 in.; petiole .25 to .4 in. Panicles solitary, terminal, several times longer than the leaves, the branches and branchlets short and the latter cymosely few-flowered, bracts small, linear, deciduous. Flowers '75 in. long (including the stamens), on pedicels shorter than themselves. Calyx-tube infundibuliform, the mouth with a broad, everted, wavy, obscurely toothed edge, deciduously scaly. Petals 4, ovate, sub-acute, glabrous. Anthers 8, equal, curved, cylindric, attenuated to the 1-pored apex, the base with two long, geniculate, upward-curving, narrow, flattish appendages. Fruit succulent, urceolate, slightly warted, sub-glabrous, crowned by the slightly enlarged mouth of the calyx, 4 in. long. C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 543; Cogn. in DC. Mon. Phan. VII, 555.

Malacca; Griffith (K.D.) 2291! Maingay 789. Singapore; Ridley 3918, 4803. Selangore; Ridley 2015. Johore; Ridley 3246, 2106. Penang; Walker, etc.

3. DISSOCHETA HIRSUTA, Hook, fil. ex Triana Trans. Linn. Soc. XXVIII, 83. A strong creeper with slender branches only slightly thickened at the nodes; all parts except the upper surfaces of the leaves and the petals densely clothed with deciduous, stellate hairs mixed with long, stiff, spreading, curved hairs. Leaves membranous, lanceolate or ovate-lanceolate, 5-nerved (the lateral pair slender), the base rounded and slightly cordate, the apex shortly acuminate; upper surface

glabrous, length 3 to 45 in.; breadth 1 to 175 in.; petiole 15 to 3 in. Panicle solitary, terminal, thickened at the nodes, broadly pyramidal, much branched. Flowers 75 in. long. Calyx-tube longer than the pedicel, cylindric-tubular, the mouth not everted but with four linear elongate teeth. Petals 4, broadly lanceolate, blunt. Stamens 8, equal, all perfect, elongate and narrow, the apices much prolonged into a rather thin appendage, the base with two delicate, filiform appendages. Fruit ovoid-globose, crowned by the persistent calyx-limb, densely setoselepidote, 4 in. in diam. Cogu. in DC. Mon. Phan. VII, 556.

JOHORE; at the base of Gunong Panti; King's Collector 197;

Ridley 4185. DISTRIB. Borneo.

4. DISSOCHETA BRACTEATA, Blume in Flora, 1831, 495. Young branches with a transverse ridge at the nodes, petioles and panicles more or less densely clothed with sub-deciduous, rusty, stellate hairs, and the under surfaces of the leaves sparsely so. Leaves membranous, 5-nerved (the marginal pair faint), ovate-lanceolate, the base rounded and often sub-cordate, the apex acute or shortly acuminate; upper surface glabrous, the lower sparsely stellate-hairy; length 3 to 4.5 in.; breadth 1.25 in.; petiole 2 to 3 in. Panicles much bracteate, both axillary and terminal, the former shorter, the latter longer, than the leaves; the branches few, divaricate. Flowers 1.2 in. long (including the stamens), in cymes at the ends of the branchlets, each subtended by, and while in bud enveloped in, a membranous, obovate, blunt, stellatepubescent, more or less permanent bract about 5 in. long. Calyx-tube twice as long as the pedicels, cylindric-campanulate, the mouth slightly widened and minutely 4-toothed. Petals broadly elliptic, blunt, glabrous. Stamens 8, much curved, long, linear, the base with two long flattened, linear, upward-pointing appendages. Fruit ellipsoid, crowned by the rim of the calyx-tube, 6 in. long. Miq. Fl. Ind. Bat. I, pt. I, 529; Triana in Trans. Linn. Soc. XXVIII, 84; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 543; Cogn. in DC. Mon. Phan. VII, 598. D. bracteosa, Naud. in. Ann. Sc. Nat. Ser. 3, XV, 76; Miq. Fl. Ind. Bat. I, pt. I, 527. Melastoma bracteatum, Jack in Trans. Linn. Soc. XIV, 9; Wall. Cat. 4044, partly.

Penang; Wallich, Cat. 4044; Curtis 2298. MALACCA; Maingay 791. DISTRIB. Borneo, Haviland.

5. DISSOCHETA PALLIDA, Blume in Flora, 1831, 500. A shrubby creeper, 20 to 50 feet long; young branches thickened and with interpetiolar ridges at the nodes, sparsely covered with minute stellate-hairy scales like the petioles, under surfaces of the leaves and the panicles. Leaves sub-coriaceous, 5-nerved (the lateral pair faint), elliptic-ovate to ovate, the base rounded and sub-cordate, the apex shortly acuminate

or acute; upper surface glabrous; length 2.5 to 5 in.; breadth 1.2 to 2.2 in.; petiole 3 to 5 in. Panicles both axillary and terminal, the former shorter than the leaves or slightly exceeding them, the latter longer, all rather lax, the branchlets divaricating, cymose, and with a few short, linear, deciduous bractlets. Flowers nearly 1 in. long (including the stamens). Calyx-tube oblong-campanulate or funnel-shaped, densely lepidote-stellate; the mouth expanded and obscurely 4-toothed. Petals obovate-oblong, blunt, glabrous. Stamens 8, usually equal (four sometimes shorter or obsolete); basal processes long, linear, sub-erect. Fruit cylindric-campanulate, sub-glabrous, crowned by the slightly enlarged limb of the calyx, 25 in. long. Blume, Mus. Bot. I, 36 (excl. syn. Korth.); Naudin in Ann. Sc. Nat. Ser. 3, XV, 69, tab. 4 fig.; Miq. Fl. Ind. Bat. I, pt. I, 528; Triana in Trans. Linn. Soc. XXVIII, 83, tab. VII, fig. 89b; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 544; Cogn. in DC. Mon. Phan. VII, 557. Melastoma pallida, Jack in Trans. Linn. Soc. XIV, 12; DC. Prodr. III, 150; Wall. Cat. 4049. Dissocheta ovalifolia and D. superba, Naud. l.c. 76 and 77. D. astrotricha, Miq. l.c. Suppl. 318.

In all the provinces except the Nicobar and Andaman Islands;

common.

The four stamens which are usually shorter than the other are sometimes obsolete.

DISSOCHETA GRACILIS, Blume in Flora, 1831, 498. A strag-6. gling or scandent shrub; young branches slender, bluntly 4-angled, the nodes swollen and transversely ridged, minutely scaly like the petioles, leaves and panicles. Leaves 5-nerved (the lateral pair slender), broadly lanceolate or oblong-lanceolate, rounded at the base and shortly acuminate at the apex; length 3 to 4.5 in.; breadth 1.5 to 1.8 in.; petiole 2 to 4 in. Panicles axillary and terminal, the former shorter than, and the latter longer than the leaves, slender, spreading, lax, many-flowered; bracts few, narrowly oblong, caducous. Flowers \*35 in. long, on filiform pedicels longer than themselves. Calyx-tube narrowly campanulate, minutely stellate-pubescent, the mouth glabrous, sub-truncate, everted, and obscurely 4-toothed. Petals 4, broadly ovate or sub-orbicular, blunt. Stamens 8; four large, perfect, rather short, with a broad truncate 2-pored apex; the four imperfect small, narrow all with two erect, filiform flat basal appendages. Fruit sub-globular, crowned by the narrow limb, almost glabrous, 1 to 15 in. in diam. Korthals Verh. Nat. Gesch. Bot. 237; Naud. in Ann. Sc. Nat. Ser. 3, XV, 75; Miq. Fl. Ind. Bat. I, pt. I, 526; Triana in Trans. Linn. Soc. XXVIII, 83, tab. VII, fig. 89c; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 544; Cogn. in DC. Mon. Phan. VII, 559. Melastoma gracile, Jack . 491

in Trans. Linn. Soc. XIV, 14; DC. Prodr. III, 149. M. fallax, Wall. Cat. 4080. ? M. glauca, Griff. Ic. Pl. As. 637. M. vacillans, var. pallens, Blume, Bijdr. 1074.

In all the provinces except the Nicobar and Andaman Islands. DISTRIB. Java, Borneo.

7. DISSOCHETA CELEBICA, Blume, Mus. Bot. I, 36. A slender creeper; young branches, petioles and under surfaces of the leaves, also the panicles, densely clothed with rusty, scurfy, stellate tomentum. Leaves 3-nerved, membranous, lanceolate or oblong-lanceolate, the base rounded, the apex shortly acuminate; upper surface glabrous except the stellate-pubescent midrib; length 2.5 to 5 in.; breadth 1 to 2 in.; petiole ·2 to ·25 in. Panicles lateral and terminal, the former slightly longer and the lateral several times longer than the leaves, ebracteate, the branches divaricating, the ultimate branches cymose, 3-flowered. Flowers 3 in. long (including the stamens). Calyx-tube oblong-campanulate, slightly widened and 4-toothed at the mouth, somewhat longer than the pedicel. Petals 4, broadly oblong, blunt. Stamens 4; anthers equal, short, blunt and with no apical appendage, opening by 2 apical pores. sub-globular, crowned by the narrow limb of the calyx, faintly 8-ribbed, sparsely pubescent or sub-glabrous, '15 to '2 in. in diam. C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 544; Cogn. in DC. Mon. Phan. VII, 561; Miq. Fl. Ind. Bat. I, pt. I, 530; Triana in Trans. Linn. Soc. XXVIII, 83. D. microcarpa, Naud. in Ann. Sc. Nat. Ser. 3, XV, 72; Miq. 1.c. 523. D. bancana, Miq. l.c. 529. Melastoma fallax, Wall. Cat. 4050; ? Jack in Trans. Linn. Soc. XIV, 13. M. rubiginosum, Wall. Cat. 4052, partly.

In all the provinces except the Nicobar and Andaman Islands; common. Distrib. Bangka, Celebes, Borneo.

VAR. contracta, King. Panicle solitary, terminal, short, condensed, not longer than the leaves.

PERAK; King's Collector 2911.

8. DISSOCHETA INTERMEDIA, Blume in Flora, 1831, 493. A somewhat slender creeper, resembling D. celebica in its other parts, but with larger flowers (5 in. long), pointed in bud; larger fruit (2 to 25 in. in diam.); calyx-tube with a truncate, toothless mouth; ovate, acute petals, and longer stamens narrowed to and appendiculate at the apex. Blume, Mus. Bot. I, 35, tab. V; Naud. in Ann. Sc. Nat. Ser. 3, XV, 72; Miq. Fl. Ind. Bat. I, pt. I, 52½; Triana in Trans. Linn. Soc. XXVIII, 83, tab. VII, fig. 89 f.; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 544; Cogn. in DC. Mon. Phan. VII, 562. Melastoma rubiginosum, Wall. Cat. 4052 (in part).

MALACCA; Griffith (K.D.) 2287; Helfer (K.D.) 2286. PENANG and SINGAPORE; Wallich. PERAK; Scortechini. DISTRIB. Java, Borneo.

9. DISSOCHETA ANOMALA, King, n. sp. A creeper 15 to 20 feet long: young branches slender, slightly thickened at the nodes, at first sparsely rusty stellate-hairy, afterwards glabrous and sub-glaucous. Leaves ovate-oblong, the base broadly rounded, the apex shortly. abruptly and bluntly acuminate, 5-nerved (the two lateral nerves faint): upper surface glabrous; the lower sparsely stellate-hairy on the midrib and nerves, otherwise glabrous; length 3.5 to 6.5 in.: breadth 1.75 to 2.75 in.; petiole sparsely hispid, 2 in. long. Panicles axillary and terminal, the former half as long and the latter twice as long as the leaves, stellate-pubescent especially at the thickened nodes: the branches divariente, trichotomous, lax, bracteate at the divisions: the bracts 3 in. long, oblong, blunt, involute, stellate-tomentose, their edges ciliate. Flowers 3 in. long, in cymes of three. Calyx-tube shorter than the pedicel, narrowly campanulate, densely stellate-tomentose; the mouth without teeth, truncate, not everted. Petals glabrous, ovate. acuminate, forming a pointed bud. Stamens 4, equal and all perfect. subsessile, broad, blunt, the lateral basal appendages filamentous. Fruit broadly campanulate, crowned by the narrow calyx-limb, glabrous. 15 in, in diam.

PERAK; King's Collector 2258, 10468.

This plant forms a collecting link between the genera Anplectrum and Dissocheta as they are defined in this work. It agrees in externals with Anplectrum pullens, and has the 4 stamens of that genus, but their anthers have the elongate basal processes so well developed in Dissocheta and not at all represented in Anplectrum.

10. DISSOCHÆTA SCORTECHINII, King, n. sp. Scandent; young branches slender, the nodes swollen and transversely ridged, thinly clothed with minute, pale, stellate hairs. Leaves ovate-lanceolate, slightly cordate at the broad base, the apex with a short, blunt point; 5-nerved (the lateral pair small); upper surface glabrous; lower rusty in colour and bearing sparse, white, stellate hairs longer than those on the stem; length 2.5 to 3.75 in.; breadth 1.5 to 2 in.; petiole densely rusty stellatetomentose, 'l in. long. Paniele solitary, narrow, terminal, shorter than the leaves, densely rusty stellate-tomentose, the branches short and few-flowered, bearing many oblong, blunt or spathulate, pale, 3-nerved almost glabrous bracts longer than the flower-bud, the lower ones much larger. Flowers 3 in. long, their pedicels short. Calyx-tube narrowly campanulate, at first densely but afterwards sparsely stellate-tomentose: the month truncate, without teeth, waved but not everted, glabrous, Petals 4, glabrous, orbicular-ovate, acuminate, forming a pointed bud. Stamens 4, all equal and perfect, short, broadly ovate, the base with two long, erect, filiform appendages, the broad apex with a small, pale

subacute appendage. Fruit unknown. D. intermedia, Scort. MSS. (not of Blume), in Herb. prop.

PERAK; Scortechini 23, 34. PENANG; Curtis 1301.

### ANPLECTRUM, A. Gray.

Twining shrubs. Leaves subcoriaceous, or rarely coriaceous, opposite, short-petioled, entire, oblong, narrowed upwards, 3-5-nerved from the base. Flowers white, in terminal panicles sometimes leafy at the base. Calyx-tube funnel-shaped or ovoid, limb obscurely 4-lobed or truncate. Petals 4. Stamens 4 perfect, rarely 8, anthers attenuated upwards. opening by one pore, connective at base shortly appendaged or subnude. never with two long bristles in front, rarely with a long appendage and two small erect bristles; imperfect stamens 4, 2, or 0. Ovary 4-celled. free at the apex, with 4 vertical ridges; style simple; ovules manv. placentas axile. Berry ovoid or globose, crowned with the calyx-limb. Seeds very many, small, falcate, obovoid; raphe long, lateral. DISTRIB. Species about 18, in Malaya and the Philippines.

Stamens 4 perfect :-

Stamens 8 perfect

Nodes of the young branches and of the lower part of the panicle with conspicuous, stellately lepidote, bristly annuli ... Nodes of the young branches and of the panicle with a small smooth annulus or faint transverse ridge :-

... 1. A. lepidoto-setosum.

Calvx-tube funnel-shaped; stamens 4, all perfect; young branches stellate-hairy ... 2. A. glaucum. Calvx-tube ovoid to globular-ovoid; stamens 8. the anthers of 4 of them narrow and imperfect; young branches glabrous or

Nodes not annulate; stamens 8, the anthers of 4 of them narrow and imperfect; young branches and panicles densely stellate-scaly ...

... 3. A. pallens.

4. A. divaricatum. 5. A. anomalum.

1. ANPLECTRUM LEPIDOTO-SETOSUM, King, n. sp. Young branches slender, conspicuously annulate at the nodes, sparsely clothed with coarse, spreading hairs with thickened points, the very youngest also with deciduous, stellate hairs. Leaves oblong-lanceolate, 5-nerved; the base rounded and minutely cordate, the apex shortly caudate-acuminate; both surfaces glabrous except for a few coarse hairs near the petiole; the lower shining and pale when dry; length 4.5 to 6 in.: breadth 1.1 to 1.8 in.; petiole very short, attached to the cup-shaped, densely rufous stellate-tomentose node and like it with scattered bristle-hairs. Panicle terminal, solitary, shorter than the leaves, everywhere densely rusty-tomentose with long bristles intermixed, annulate at the bases of the short, spreading, few-flowered branches. Calyx-tube cylindric; the mouth undulate-truncate, obscurely toothed, its outer surface stellate-lepidote with a few long bristles near the mouth. Petals 4, ovate, glabrous. Stamens 8 (4 large and 4 small); the large broad, and with a short, grooved ridge on the back near the base, blunt; the 4 small linear, very acuminate. Capsule ovoid-globular, truncate, nearly glabrous, 15 in, in diam.

PERAK ; Scortechini 2106.

ANPLECTRUM GLAUCUM, Triana in Trans. Linn. Soc. XXVIII, 84 (excluding much of the synonymy). Scandent, to 20 or 30 feet; young branches 4-grooved, stellate-hairy like the petioles and main nerves of the leaves and the inflorescence, the nodes inconspicuously annulate or transversely ridged. Leaves oblong-lanceolate, rounded or slightly narrowed to the often slightly cordate base, the apex shortly acuminate or acute, boldly 3-nerved; both surfaces glabrous except for some scattered, stellate hairs; length 3 to 5 in.; breadth 1 to 2 in.; petiole '5 to '25 in. Panicle large, terminal, solitary, several times larger than the leaves, pyramidal, its branches divaricate, manyflowered. Flowers drooping, '4 or '5 in. long (including the stamens). Calyx-tube funnel-shaped, sub-glabrous; the mouth truncate, not toothed, everted with age. Petals ovate-lanceolate with truncate bases. the apex acuminate. Stamens 4; anthers much curved, all perfect, their bases not lobed but with a corrugated membranous process in Ovary prominently 4-winged. Fruit truncate, sub-globular, glabrous, 2 in. long (when dry). C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 545; Cogn. in DC. Mon. Phan. VII, 566. A. cyanocarpum, Kurz in Journ., As. Soc., 1877, pt. 2, p. 78 (not of Triana). Melastoma glauca, Jack in Trans. Linn. Soc. XIV, 15; DC. Prodr., 151. M. cernuum, Wall. Cat. 4055 (not of Roxb.). Osbeckia tetrandra, Roxb. Fl. Ind. II, 224. Dissochæta glauca, Blume in Flora, 1831, p. 501. D. spoliata, Naud. in Ann. Sc. Nat. Ser. 3, XV, 69, t. 4, fig. 1.

In all the provinces, common. DISTRIB. Sumatra, Java, Borneo.

3. ANPLECTRUM PALLENS, Blume, Mus. Bot. I, 38. Scandent, to 30 or 40 feet; young branches terete, glabrous or minutely puberalous, especially near the slightly thickened and transversely ridged nodes, round. Leaves oblong, the base rounded, the apex abruptly, bluntly and shortly sub-caudate acuminate, 5-nerved (the marginal pair slender), the edges (when dry) slightly recurved; upper surface glabrous, the lower minutely and scantily stellate-puberulous; length 1.5 to 4.5 in., breadth .5 to 1.5 in.; petiole .1 to .2 in. Fanicles axillary (about as

long as the leaves) and terminal (much longer than the leaves), slender, spreading, lax, rather few-flowered, with a small, blunt, oblong, deciduous bract under each branch, finely rufous stellate-pubescent. Flowers about 4 in. long (including the stamens). Calyx-tube ovoid to globular-ovoid, densely rufous-puberulous when young, glabrous when old, the mouth slightly expanded and with very small teeth. Petals ovate, acute, glabrous. Anthers; the four large much curved and subacute; the rudimentary linear, acuminate. Capsule globose-obovoid, glabrous, 15 in. in diam. Naud. in Ann. Sc. Nat. Ser. 3, XV, 303; Triana in Trans. Linn. Soc. XXVIII, 303; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 545; Cogn. in DC. Mon. Phan. VII, 564. Melastoma petiolare, Wall. Cat. 4053.

In all the provinces except the Andaman and Nicobar Islands; not uncommon. DISTRIB. Sumatra, Borneo.

4. ANPLECTRUM DIVARICATUM, Triana in Trans. Linn. Soc. XXVIII. 84 (in part), tab. VII, fig. 90b. Scandent, to 20 or 30 feet; young branches obscurely quadrangular, and like the petioles, nerves of the leaves on both surfaces, and the inflorescence, densely covered with tawny, stellate scales, not annulate at the nodes. Leaves lanceolate. acute or sub-acute, the base minutely cordate, 5-nerved, the marginal pair slender; both surfaces, but especially the lower, with glandularpunctate scales between the nerves and veins; length 2 to 3 in.; breadth '6 to 1.1 in.; petiole 15 to 25 in. Panicle solitary, terminal, pyramidal, several times as long as the leaves, the branchlets divaricate, each with two ovate-lanceolate, ciliate, furfuraceous, deciduous bracts at its base and three flowers in a cyme at the apex. Flowers 4 in, long, on short pedicels. Petals oblong, acute. Calyx-tube narrowly obovoid, campanulate, truncate, densely furfuraceous stellate-tomentose. Anthers 8; the 4 large thick and much curved, obtuse; the smaller narrow. Capsule globose-obovoid, with a narrow, everted rim, length 15 to 2 in. C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 546; Cogn. in DC. Mon. Phan. VII, 567. Melastoma divaricatum, Willd. Spec. Pl. II, 596; DC. Prodr. III, 150. M. polyanthum, Benth. in Wall. Cat. 4051. Dissocheeta divaricata and D. pepericarpa, Naud. Ann. Sc. Nat. Ser. 3, XV, 70 and 71, D. anceps, Naud. l.c. 70. D. palembanica, Miq. Fl. Ind. Bat. Suppl. 317.

MALACCA; Griffith (K.D.) 2288/1: Maingay (K.D.) 794: Harrey. Penang; Wallich 4051. Perak; King's Collector 369. Distrib. Java, Borneo, Sumatra.

5. ANPLECTRUM ANOMALUM, King and Stapf, n. sp. A woody creeper, 20 to 100 feet long; young branches as thick as a wheat-straw, terete, covered with stellate, rusty scurf. Leaves coriaceous, obovate or

oblong, blunt, much narrowed to the base, 3-nerved, glabrous on the upper, rusty stellate-hairy on the lower surface like the petioles and inflorescences; length 1 to 1.5 in.; breadth 6 to 9 in.; petiole 2 in. Panicles terminal, sometimes leafy, 3 to 6 in. long, lax, the branches in pairs, divaricate, many-flowered, minutely bracteolate at the divisions. Flowers 35 in. long, the pedicels somewhat longer. Petals oblong, obtuse, waxy, reflexed, pale greenish-white. Stamens 8, equal; anthers inflexed in aestivation, lanceolate-subulate, the base of the lobes produced into an elongated halbert-shaped process with two erect subulate processes at its broad upper end. Fruit (not quite ripe) ovoid-globose, greenish-yellow, 2 in. in diam.

PERAK; King's Collector 5779, 10357.

This plant differs from Anplectrum, as the genus has hitherto been limited, in having 8 anthers, each of which has a very much produced halbert-shaped basal process, from which two erect hair-like appendages originate at the upper or broad end. The plant agrees better with Anplectrum than with any other Melastomaceous genus, but it might possibly be better treated as the basis of a new one.

#### 13. MEDINILLA, Gand.

Branching shrubs, erect or scandent. Leaves opposite or whorled, rarely alternate, entire, often fleshy, mostly glabrous, usually longitudinally 3-9-nerved. Flowers in terminal panieles or lateral cymes, white or rose, with or without bracts, 4- or 5-, rarely 6-merous. Calya-tube ovoid or cylindric, limb truncate or obscurely toothed. Stamens twice as many as the petals, equal or nearly equal (rarely unequal); anthers opening at the top by one pore; connective not (or very shortly) produced at the base but having two tubercles in front and a spur behind. Ovary inferior, 4-6-celled, usually glabrous at the apex; style filiform; ovules very many, placentas axile. Berry crowned by the limb of the calyx. Seeds very many, ovoid or subfalcate, raphe often thickened and excurrent.—Distrib. Species about 100; mainly in Malaya, East Bengal and Ceylon; a few in the Fiji Archipelago and in the East African islands.

## Flowers 4-merous:-

Leaves alternate ... ... ... 1. M. scandens.
Leaves in whorls (large) ... ... 2. M. speciosa.

Leaves opposite :-

Flowers in terminal panicles, anthers dissimilar ... 3. M. heteranthera.

Flowers in lateral panicles, anthers similar:-

Anther-cells with tubercles at their bases in front, and a short spur from the connective behind:—

Flowers 1 in. long ... ... 4. M. enusta.

Flowers under '5 in. long :-5. M. Hasseltii. Leaves petiolate 6. M. Scortechinii. Leaves sessile Anther-cells with tubercles at the base in front, 7. M. Maingayi. but no spur from the connective behind Flowers 5-merous:-Leaves in whorls :-Leaves elliptic or obovate, blunt, 1 to 2.75 in. long, 8. M. Clarkei. fruit '15 in. in diam. Leaves oblanceolate or narrowly obovate, acuminate, 3 to 5 in. long; fruit '4 in. in diam. ... 9. M. crassinervia. Leaves elliptic-rotund, blunt, 2.5 to 5.5 in. long; fruit '35 in, in diam, ... 10. M. perakensis.

1. Medinilla scanders, King, n. sp. A climber, 15 to 30 feet long, rooting and adhering to trees; the stems rough, as thick as a swan's quill. Leaves alternate, glabrous, long-petioled, subcoriaceous, elliptic or ovate-oblong, shortly acuminate, the base cuneate; nerves 5 to 7, mostly from the midrib above its base; length 4.5 to 9 in.; breadth 2.5 to 6 in.; petioles 1.5 to 7 in. Flowers 4 in. long, in dense fascicles in the axils of fallen leaves, on rusty-puberulous, minutely bracteolate pedicels. Calyx-tube narrowly campanulate; the limb very slightly expanded, truncate, very obscurely toothed. Petals 4, ovate-oblong, acute. Stamens 8; anthers narrowly elliptic, with a long apical 1-pored beak; and at the base a short, broad, blunt process from the connective behind, the lobes of the anthers slightly produced in front and minutely tuberculate.

PERAK; Scortechini 86 and 150; King's Collector 1814.

This resembles M. alternijolia, Blume, but has a much shorter spur from the connective at the base of the anthers. It has also larger leaves and more numerous flowers in the fascicles.

2. Medinilla speciosa, Blume in Flora, 1831, p. 515. A glabrous shrub or small tree, not epiphytal; young branches as thick as the little finger, 3- or 4-angled; the bark shining, pale when dry, bearing at the nodes numerous stout, subulate bristles 5 in. long. Leaves large, subcoriaceous, in whorls of 3 (rarely of 4) or in pairs, sessile, or very shortly petiolate, oblanceolate or obovate-oblong, sometimes elliptic, acute, the base cuneate, nerves 7 to 9 mostly from the midrib above its base, all except the lowest pair bold, the veins slender; length 6 to 12 in.; breadth 2.75 to 5 in. Panicles lateral and terminal, 4 to 8 or even 14 in. long, on peduncles equally long, many-flowered; the branches with a whorl of small reflexed bracts at their bases; whorled, spreading, minutely bracteolate at the divisions. Calyx-tube cupular, slightly constricted below the narrow, minutely 4-touthed limb. Petuls 4, ovate-

acute. Fruit ovoid, 3 in. in diam. Bot. Mag. t. 4921; Morren in Ann. Soc. Hort. Gand. V, 281; Naud. in Ann. Sc. Nat. Ser. 3, XV, 291; Miq. Fl. Ind. Bat. I, pt. I, p. 540; Triana in Linn. Trans. XXVIII, 87; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 549. Melastoma eximium, Blume Bijdr. (not of Jack). Melastoma speciosum, Reinw. ex Blume, in Flora, 1831, 516.

MALACCA; Maingay (Kew Distrib.) 798. Penang; Hullett 203; Curtis 874; King's Collector 1595. Peran; Wray 3218; King's Collector 2652. Distrib. Moluccas, Java, Sumatra.

3. Medinilla heteranthera, King, n. sp. Epipytal and terrestrial; branches slender, smooth, reddish when fresh, drying dark purplish-brown. Leaves of the pairs somewhat unequal, ovate-lanceolate to lanceolate, acuminate, the base slightly narrowed, glabrous, 3-nerved; length 2.5 to 5.25 in.; breadth 1 to 1.8 in.; petioles 3 to 8 in. Panicles terminal on the branches, half as long as the leaves, corymbosely cymose, 5- or 6-flowered, minutely bracteolate. Flowers .75 in. long, their pedicels much shorter. Calyx-tube cylindric, the mouth wide and with 4 broad, shallow teeth. Petals 4, ovate-lanceolate, shortly acuminate. Stamens 8; anthers unequal, the larger four twice as long as the shorter four, all curved, much acuminate and with two tubercles at the base in front, the shorter 4 with a short spur on the connective behind, the larger with no spur. Fruit globular-ovoid, crowned by the wide calyx-limb, .35 in. in diam.

Perak; Scortechini 341; King's Collector, 3291, 3644, 6304, 6904; Wray 397; at elevations of from 3000 to 4500 feet.

This resembles M. Horsfieldii, Miq.,—a species from Java and Borneo—which however has 5-merous flowers, obovate petals and leaves of thinner texture. According to Scortechini the petals are waxy white tinged with red and the stamens are yellow.

Var. latifolia. Leaves broadly elliptic, shortly acuminate, the base cuneate, 2.5 to 3.75 in. long and 1.5 to 2 in. broad.

PERAK; King's Collector 8017; Wray 268.

4. Medinilla venusta, King, n. sp. Epiphytal, 2 to 4 feet long, glabrous; branches stout, with large, scattered tubercles, glabrous. Leaves large, opposite, thinly coriaceous, sessile, elliptic, shortly acuminate, narrowed to the base, boldly 3-nerved above the base with often a faint, small, basal, marginal pair; length 6 to 9 in.; breadth 2.75 to 4 in. Cymes much shorter than the leaves, laxly umbellate, axillary or from the axils of fallen leaves, about 6-flowered; the pedicels slender, bibracteolate at the base. Flowers nearly 1 in. long. Calyxtube campanulate, 35 in. long, with a narrow, obscurely 4-toothed limb.

Petals 4, broadly ovate, acute. Stamens 8; anthers equal, linear-lanceolate, much acuminate, curved, the tubercles at the front of the base as long as the posterior basal spur from the connective. Fruit nuknown.

PERAK; King's Collector 2390.

5. MEDINILLA HASSELTH, Blume in Flora, 1831, p. 513. Epiphytal on trees, 3 or 4 feet high; branches slender, terete, pale, more or less prominently warted (the warts black). Leaves opposite, coriaceous, oblong-lanceolate, acuminate, narrowed to the rounded base, 3-nerved, with sometimes a faint, additional lateral pair; length 4.5 to 5.5 in.; breadth 1.25 to 1.75 in; petioles .15 to .35 in. Cymes axillary or from the axils of fallen leaves, less than half as long as the leaves, (more than half as long in VAR. Griffithii), broader than long; the branches divaricate, 8-12-flowered, minutely bracteolate. Flowers 35 in. long. tube campanulate-cylindric, somewhat constricted below the minutely 4-toothed mouth. Petals 4, obovate-oblong. Stamens 8, equal; the anthers linear-oblong, somewhat curved, the base with two short, black, conical protuberances in front and a similar one behind. Fruit globular, truncate, '2 to '25 in. in diam. Miq. Fl. Ind. I, pt. I, 542; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 547; Cogn. in DC. Mon. Phan. VII, 586. Melastoma laurifolium in Wall. Cat. 4084 (not of Blume). Medinilla crassifolia, Triana in Trans. Linn. Soc. XXVIII, 86 (in part).

MALACCA; Griffith (Kew Distrib.) 2282; Maingay (Kew Distrib.) 797, Wallich 4084. Perak; very common. Singapore; Anderson. Sungei Ujong; Ridley 2205, Selangore; Curtis 2334; Ridley 286.

PANGKORE; Curtis 1642.

DISTRIB. Java, Sumatra.

VAR. Grifithii, C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 547. Cymes much branched, more than half as long as the leaves, many-flowered.

MALACCA; Griffith (Kew Distrib.) 2282.

6. MEDINILLA SCORTECHINII, King, n. sp. Epiphytal, 3 or 4 feet high; stems as thick as a goose-quill, the bark brown (when dry), sparsely verrucellate. Leaves opposite, coriaceous, glabrous, sessile, stem-clasping, oblong-ovate to oblong, shortly acuminate, the base sub-cordate, 3-nerved, with occasionally a faint pair at the margin; length 4.5 to 6.5 in.; breadth 1.5 to 2.75 in. Panicles cymose, axillary, rather shorter than the leaves, very lax, spreading; the branches slender, minutely bracteolate at the divarications; the branchets compressed, sometimes 2-winged. Flowers nearly 4 in. long, on pedicels as long as themselves. Calyx-tube campanulate, the mouth not much

expanded, obscurely 4-toothed. Petals 4, oblong, acute, reflexed. Stamens 8; anthers curved, linear-lanceolate, with a short 1-pored apical process; the base with a short, sharp, downward-pointing spur from the connective; the bases of the anther-cells each with a linear, curved, small tubercle as long as the spur, and like it dark in colour when dry. Fruit ovoid-globular, 2 in. in diam.

Perak; Scortechini 307, 478, 622; Curtis 1297; Wray 391, 1739;

King's Collector 4188.

The nearest ally of this is M. javanensis, Bl.

7. Medinilla Maingari, C. B. Clarke in Hook, fil. Fl. Br. Ind. II, 549. A small epiphyte with slender, terete, pale, smooth branches. Leaves opposite, thinly coriaceous, obovate, with rounded apices and cuneate bases, obscurely 3-nerved, the lower surface rather paler than the upper when dry; length '65 to 1.25 in.; breadth '5 to '75 in.; petiole '05 to '2 in. Cymes much shorter than the leaves, with short, divaricate, broadly bracteolate branches, few-flowered. Flowers '25 in. long, their pedicels shorter. Calyx-tube narrowly campanulate, with a slightly expanded, minutely 4-toothed limb. Petals 4, lanceolate, sparsely strigose outside. Stamens 8; anthers lanceolate, without protuberences at the base in front, but with a short spur behind. Fruit unknown. Cogn. in. DC. Mon. Phan. VII, 586.

MALACCA; Maingay (Kew Distrib.) 806, 807. PERAK; Wray 3781.

SINGAPORE; Ridley 1652, 2018. PAHANG; Ridley 2663.

8. Medinilla Clarket, King, n. sp. A small epiphyte; young branches with dark, rough, tubercled bark. Leaves in whorls of three or four, broadly elliptic to obovate, blunt or subacute, the base cuneate; the upper surface rugulose and green when dry, the lower pale-brown; length 1 to 2.75 in., breadth .75 to 1.8 in.; petiole .4 to .8 in., puberulous. Cymes about as long as the leaves or slightly longer, from the axils of fallen leaves, on slender pedicels from .5 to .75 in. long, the branches whorled, spreading, minutely bracteolate at the divisions; pedicels slender. Flowers 20 to 30, .3 in. in length. Calyx-tube cupular, the mouth truncate and usually obscurely toothed, sometimes distinctly 5-toothed. Petals 5, broadly ovate to rotund, blunt. Stamens 10; anthers linear-lanceolate; the base with two small tubercles in front, and a small spur behind. Fruit globular-truncate, .15 in. in diam. M. rosea, C. B. Clarke in Hook, fil. Fl. Br. Ind. II, 547 (not of Gaudichand).

MALACCA; Griffith (Kew Distrib.) 2282; Maingay (Kew Distrib.) 796; Stoliczka in Herb. Calc. Perak; Scortechini 243; Wray 206, 412, 3831, 4084; King's Collector 7333; at elevations of from 3000 to 5000

feet.

M. rosea, Gand., to which this plant has been referred in the Flora of British India, is a tetramerous species from the Marianne Islands. It has, morever, larger flowers than this and larger, more acute leaves. This plant varies in the size of its leaves: specimens collected at the highest elevations having the largest leaves. The structure of the flowers is, however, uniform.

MEDINILLA CRASSINERVIA, Blume in Flora, 1831, 510. Branches with pale bark, the older terete, the youngest striate when dry. Leaves in whorls of 3, coriaceous, broadly oblanceolate, or narrowly obovate, shortly and abruptly acuminate, much narrowed to the base, 3-nerved from a little above the base, occasionally with two short lateral faint nerves from the very base; length 3 to 5 in.; breadth 1.5 to 2 in.; petiole 35 to .75 in. Flowers in short fascicles on the stem below the leaves, in few-flowered pedunculate cymes, mixed with a few solitary, on pedicels 5 in. long. Calyx-tube ovoid-campanulate, the mouth truncate and almost entire. Stamens 10, subequal; the basal anterior processes broad and about as long as the filiform posterior spur. Fruit globose with a cylindric truncate mouth, 4 in. across. Blume Rumphia I, 15; Miq. Fl. Ind. Bat. I, pt. I, 545; Cogn. in DC. Mon. Phan. VII, 574. M. macrocarpa, Clarke (not of Blume) in Hook. fil.

Fl. Br. Ind. II, 547. PERAK: Wray SINGAPORE; Ridley 1637. PENANG; Curtis 2225. MALACCA; Maingay (Kew Distrib.) 799. DISTRIB.

True M. macrocarpa, Bl., is represented in the Kew Herbarium by a single specimen collected by Blume in the Moluccas. The flowers on it have, as described by the author of the species, an irregularly toothed calyx-limb. The plant now described differs in having an almost entire truncate limb, and I follow Cogniaux in referring it to M. crassinervia, Bl. In the Flora of British India it is, however, referred to M. macrocarpa, Bl.

Epiphytal; branches 10. MEDINILLA PERAKENSIS, King, n. sp. Leaves in whorls of 3 or 4, coriaceous, terete, glabrous, tubercled. elliptic-rotund, blunt, the base rounded and narrowly cordate, glabrous; 5-nerved, the lateral pair of nerves faint; length 2.5 to 5.5 in.; breadth 1.75 to 3.75 in.; petioles 6 to 1.2 in. Panicles cymose, on rather long peduncles from the axils of fallen leaves, shorter than the leaves, lax, 12- to 20-flowered; branches spreading, whorled, 2-3-chotomous. Flowers 5 in. long, their pedicels 35 in. Calyx-tube cupular; the limb but little expanded, cut into 5 shallow, broad teeth. Petals 5, oblong. Anthers 10, curved, with 2 yellow tubercles at the base in front and a short spur behind from the connective. Fruit 35 in. in diam.; the seeds oblong, obtuse, with an excurrent tail, the testa pitted.

PERAK; Scortechini 410; Wray.

Collected only by the late Father Scortechini and Mr. Wray. According to the field-note of the former, the petals and anthers are white and the fruit blueishcarnation. The nearest ally of this is M. montana, Cogn.—a New Guinea species—which has however, longer flowers, a wider calyx-tube, more slender branches which are moreover smooth, and narrower leaves narrowed at the base.

#### 14. POGONANTHERA, Blume.

Shrubs; branches round, minutely scaly. Leaves opposite, petioled, oblong or ovate, entire, glabrous, 3-nerved. Flowers small, pulverulent, in small, terminal panicles having opposite, cymose branches. Calyxtube narrowly campanulate, subquadrangular; limb 4-toothod. Petals 4, oblong-lanceolate. Stamens 8, equal; anthers oblong, acute, opening by a terminal pore, not produced at the base; connective at the base bearded behind with a tuft of hairs, not spurred. Ovary half-inferior, 4-celled, with a tuft of hairs at the apex; style filiform; ovules very many, placentas axile. Berry small, globose, 4-celled, crowned with the calyx-limb. Seeds very many, obovoid-oblong, smooth. Distrib. Species 2; Malayan.

POGONANTHERA PULVERULENTA, Blume in Flora, 1831, 521. epiphytic shrub, all parts (but especially the calyx-tube) bearing pale yellow scales; the stems sparsely lenticellate. Leaves rather fleshy, ovate-oblong to oblong-lanceolate, acute or shortly acuminate, the base more or less narrowed and bituberculate, 3-5-nerved; the margins obscurely crenate and slightly reflexed; upper surface glabrous. the lower paler and minutely pulverulent; length 3 to 65 in.; breadth 1.75 to 3 in.; petiole 25 to 6 in., stout. Panicles terminal, 2 to 3 in. long and equally broad, cymose, the branches spreading. Calyx-tube sub-cylindric, constricted below the expanded 4-toothed mouth, very scaly. Petals 4, oblong, densely scaly externally. Stamens 8; anthers lanceolate, the connective with a tuft of hairs at the base behind. Fruit pisiform, 15 in. in diam. Korth. Verh. Nat. Gesch. Bot. t. 65; Griff. Notul. IV. 678; Miq. Fl. Ind. Bat. I, pt. I, 553; Triana in Trans. Linn. Soc. XXVIII, 89; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 550; Cogn. in DC. Mon. Phan. VII, 610. P. reflexa, Blume in Flora, 1831, 521; Mus. Bot. Lugd. Bat. I, 24; Naud. Ann. Sc. Nat. Ser. 3, XV, 303, tab. 15, fig. 1; Triana l.c. 89; Beccari Malesia, II, 241, tab. LIX, 4-5. P. squamulata, Korth. (ex Blume) Mus. Bot. I, 24. Melastoma reflexa, Reinw. ined. (ex Blume in Flora, 1831, 521). M. rubicunda, Jack in Trans. Linn. Soc. XIV, 19; Wall. Cat. 4086. M. pulverulenta, Jack in Trans. Linn. Soc. XIV, 19; DC. Prodr. III, 149; Blume in Bijdr., 1072.

SINGAPORE; PERAK; MALACCA; PENANG; common. DISTRIB. Java, Sumatra, Borneo.

I have followed Mr. Clarke in reducing *P. reflexa*, Bl. here, as I can find no tangible character to separate it. *P. reflexa* is said to have white tumid petals not toothed on the margin, while typical *P. pulverulenta* is described as having red petals with a single tooth on each margin. The union of the two species was suggested by Naudin.

## 15. PACHYCENTRIA, Blume.

Glabrous, often scandent shrubs, with cylindric or obscurely angled, pulverulent branches. Leaves somewhat fleshy, oblong or ovate-lanceolate, entire or obscurely crenulate. Flowers small, rose-coloured, corymbose, the pedicels 2-bracteolate, 4-merous. Calyx-tube ovoid or turbinate, the part beyond the ovary angular, constricted below the obscurely 4-toothed mouth. Petals ovate or oblong, subacute or acuminate. Stamens 8, equal; anthers linear-oblong or subulate, rostrate at the apex and minutely 1-pored; the connective not produced at the base, inappendiculate in front but minutely spurred at the back. Ovary adherent beyond its middle, 4-celled, its apex free, conic, angled; style filiform, the stigma obtuse or capitate. Berry globose, crowned by the limb of the calyx. Seeds dimidiately obovoid, the raphe lateral. Distrib. About 12 species, all Malayan.

PACHYCENTRIA TUBERCULATA, Korth. Ver. Nat. Gesch. Bot. 246, t. 63. Epiphytic; branches as thick as a swan's quill, glabrous below but with rusty scurf near the apices, the bark pale; the roots bearing woody tubercles. Leaves somewhat fleshy, narrowly elliptic-oblong, subacute, narrowed at the base, the edges entire, 3-nerved; length 2·5-4·5 in.; breadth 9-1·25 in.; petioles '15-2 in. Panicles terminal or axillary, pedunculate; the branches spreading, cymose, 2-2·5 in. long and as wide. Flowers '25 in. long, the pedicels shorter. Calyxtube campanulate, the mouth truncate, obscurely 4-lobed. Petals 4, lanceolate. Stamens 8, equal, shortly spurred at the base behind. Fruit globular, glabrous, '15 in. in diam. Blume, Mus. Bot. Lugd. Bat. I, 23; Miq. Fl. Ind. Bat. I, pt. I, 552; Triana in Linn. Trans. XXVII, 89, tab. VII, fig. 95a.

PERAK; King's Collector 1707, 10569; Wray 3422; Scortechini 260, 550, 1961. SINGAPORE; Anderson 55. PENANG; Curtis 347; Hullett 158. DISTRIB. Borneo, Burma (Tenasserim, Griffith).

## 16. ASTRONIA, Blume.

Shrubs with opposite, petioled, ovate or oblong, entire, 3-nerved leaves. Flowers in terminal panicles, small, white or purple. Calyatube campanulate; limb irregularly truncate or 3-8-lobed. Petals 4-5. Stamens 8-10-12, equal; filaments short, broad; authers short, obtuse,

opening by slits down the front, connective spurred at the base or unappendaged. Ovary inferior, 2-5-celled, glabrous at the apex; style short, stigma capitellate; ovules numerous, placentas axile, nearly basal. Capsule finally breaking up irregularly. Seeds very many, linear, raphe excurrent.—Distrib. Species 24; in Malaya and the Pacific Islands.

ASTRONIA SMILACIFOLIA, Triana in Trans. Linn. Soc. XXVIII, 152. Young shoots, petioles, under surfaces of the young leaves and inflorescence rufous-lepidote. Leaves oblong, tapering to each end, the transverse nerves stout and distant; length 3·5-5·5 in., breadth 1·5-2·5 in.; petiole ·75-1 in. Panicle usually terminal, condensed, 1-2 in. in diam.; branches numerous, short, the pedicels shorter than the globular, minutely 5-toothed calyx-tube. Petals reflexed, obovate. Fruit subglobular, truncate at the apex, ·25 in. in diam. C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 550; Cogn. in DC. Mon. Phan. VII, 1094. Melastoma smilacifolia, Wall. Cat. 4057.

Penang; Wallich, Curtis. Malacca; Maingay (K.D.) 808. Perak; Scortechini 683; Wray 2813.

Var. lepidophylla, Scort. MSS. Arboreous; inflorescence, leaves on the under surface and petioles (when young) densely covered with deciduous scales.

PERAK; Scortechini 1875; King's Collector 7270, 2027.

This variety is described by Scortechini and Kunstler as a tree 50-80 feet high, the typical form never being more than a large bush.

# 17. PTERNANDRA, Jack.

Large shrubs or trees, glabrous or minutely pubescent. Leaves sub-coriaceous or coriaceous, opposite, short-petioled or sub-sessile, entire, 3-5-nerved. Flowers solitary and axillary on long peduncles, or in axillary or teminal, often very short, and clustered cymes; the pedicels often 2-bracteolate. Calyx-tube campanulate or hemispheric, tesselate, verrucose, or covered with more or less adpressed, often puberulous scales the mouth truncate, often 4-toothed. Petals 4, ovate or oblong, blueish or white. Stamens 8, equal in length, but the anthers of some of them often imperfect, perfect anthers broad, blunt, shortly spurred behind but never in front, dehiscing by slits, the filaments stout, often geniculate. Ovary inferior, 4-celled: the apex glabrous, depressed or flat; style filiform; stigma clavate; ovules numerous, placentas sub-basal. Berry subglobose or ovoid, truncate or surmounted by the calyx-teeth, scaly or smooth. Seeds cuneate-ovoid, or obovoid, angular.—Distrib. Species about 12; in Malaya and the Philippines.

Calyx-tube tesselate outside, not covered with distinct scales ... ... ... ... ... ... ... 1. P. carulescens.

Calyx-tube covered with large distinct scales:—
Young branches and under surfaces of leaves rusty-pubescent; calyx-tube 2-3 in. long, covered with more or less spreading scales; teeth of calyx spreading, elongate, acuminate ... ... 2. P. echinata.

Young branches and under surfaces of leaves glabrous; calyx-tube 15 in. long, its scales

adpressed; teeth of calyx broadly triangular, blunt, reflexed ... 3. P. Griffithii.

1. PTERNANDRA CERULESCENS, Jack in Mal. Misc. II, 61. A tree: young branches cylindric with deciduous, dark-brown, glabrous bark and slightly thickened nodes with obscure transverse ridges. chartaceous or sub-coriaceous, broadly ovate, ovate-lanceolate, ovateoblong or elliptic, much narrowed at the base, the apex shortly acuminate, 3-5-nerved; both surfaces glabrous; length 2.5-5 in. (10 in, in var. 2); breadth 1.25-2.5 in., (to 5 in. in var. 2) petiole 1-2 in. Flowers in short, axillary, pedunculate cymes (often several from one axil), or in terminal cymes, shorter than the leaves. Calyx-tube cylindric-campanulate, 15 in. long, tesselate; the mouth truncate but with 4 small, erect, triangular teeth. Petals thick, ovate, reflexed after expansion. Stamens 8, equal in length; the filaments short, geniculate: perfect anthers 4 or 5, broadly ovate, blunt, shortly spurred behind, the remaining 3 or 4 imperfect, as long as but much narrower than the perfect. Fruit turbinate or sub-hemispheric, truncate, nearly smooth. 15-3 in. in diam. Wall. Cat. 4077; Triana in Trans. Linn. Soc. XXVIII, 153; Kurz, For. Fl. I, 509 and in Journ. As. Soc. 1877, pt. II, 79; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 551; Cogn. in DC. Mon. Phan. VII, 1103. Ewyckia cyanea, Blume Rumph. I. 24, t. 8; Miq. Fl. Ind. Bat. I, pt. I, 568; Triana l.c. E. Jackiana, Walp. Rep. V. 724. Apteuxis trinervis, Griff. Notul. IV, 672.—Nov. Gen. Roxb. Fl. Ind. II, 225.

In all the provinces except the Andaman Islands.

A common and variable plant of which four forms seem worthy of separation as varieties. These, however, pass into each other by numerous connecting specimens. One variety (Jackiana) differs from the typical-plant in having few-flowered almost sessile cymes; a second (capitellata) has sub-sessile cymes and much larger leaves and the third (paniculata) is probably only an example of fasciation.

VAR. 1. Jackiana, Clarke in Fl. Br. Ind. II, 551. Flowers in very short, few-flowered, almost sessile, axillary cymes. Leaves as in the typical form but with slightly longer petioles.

In all the provinces except the Andaman and Nicobar Islands, equally abundant with the typical form.

Var. 2. capitellata, King. Leaves thicker in texture than in the typical form (sub-coriaceous), broadly elliptic to sub-orbicular, with 3 very strong nerves and a fainter marginal pair; length 4:5-10 in.; breadth 2:75-5 in., petiole 2-3 in. Flowers in dense, very shortly-stalked, axillary glomeruli composed of numerous 3-flowered cymes very much shorter than the leaves. Pternandra capitata, Jack in Mal. Misc. II, addenda prefixed to the paper p. 3; Wall. Cat. 4079; W. aud A. Prodr. 325; Triana in Trans. Linn. Soc. III, 153; Kurz, For. Fl. I, 509 and in Journ. As. Soc. 1877, pt. II, 79; C. B. Clarke in Hook fil. Fl. Br. Ind. II, 551; Cogn. in DC. Mon. Phan. VII, 1103. Ewyckia capitellata, Walp. Rep. V, 724; Miq. Fl. Ind. Bat. I, pt. I, 568. E. medinilliformis, Naud. in Ann. Sc. Nat. Ser. 3, XVIII, 261.

SINGAPORE; Wallich 4079. PENANG; Curtis 67; King. PERAK; Scortechini 43, 1043; Wray 1971. MALACCA; Maingay 802 (K.D.); Helfer (K.D.) 2279.

Var. 3. paniculata, King. Flowers in large, lax, terminal, much branched, few-flowered, leafy and bracteolate panicles. Leaves of the stem 2-6 in. long and from 9-2.75 in. broad, those of the panicle from .75-2 in. long and .15-8 in. broad. P. paniculata, Benth. in Wall. Cat. 4080; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, .551; Cogn. in DC. Mon. Phan. VII, 1104. Ewyckia latifolia, Blume Mas. Bot. I, 6. E. cyanea, var. latifolia, Korth. ex Miq. Fl. Ind. Bat. I, pt. I, .568. E. paniculata, Miq. l.c. Suppl. 321. Pternadra latifolia, Triana in Linn. Trans. XXVIII, 153.

Penang; Wallich 4080; Curtis 2768. Malacca; Griffith (K.D.) 2273. Perak; Scortechini 248, 1303; Wray 92. Distrib.; Borneo, Bangka.

2. PTERNANDRA ECHINATA, Jack, Mal. Mis. II, n. 9 and add. prop. 3. A small tree; young branches quadrangular, thickened and with transverse ridges at the nodes, minutely rusty-pubescent. Leaves subcoriaceous, boldly 3-nerved, lanceolate or oblong-lanceolate, 3-nerved. narrowed to the base, shortly acuminate at the apex; upper surface glabrous; the lower puberulous or sub-glabrous, minutely reticulate; length 2.5-4.5 in.; breadth .75-1.75 in.; petiole .05-2 in. Flowers axillary and solitary on pedicels longer than themselves, or in threes in terminal pedunculate cymes, the pedicels of both sets of flowers with one or more pairs of curved, linear-oblong bractcoles. Calya-tube widely campanulate, 2-3 in. long, closely covered with triangular rustvpubescent scales, those nearest the mouth longest, most acute, and most persistent; the mouth truncate and with 4 narrow, acuminate teeth. Petals broadly ovate-quadrate, abruptly and shortly acute, the edges undulate, blue. Anthers broadly ovate, on thick short filaments. Fruit sub-hemispheric, truncate, sub-echinate, 35 in. in diam. Wall. Cat. 4078. Kibessia echinata, Cogn. in DC. Mon. Phan. VII, 1108. Kibessia simplex, Korth. Verh. Nat. Gesch. Bot. 253; Blume, Mus. Bot. I, 9; Triana in Trans. Linn. Soc. XXVIII, 152; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 552. Kibessia cupularis, Done in Deless. Ic. Sel. V, t. 5; Ann. Sc. Nat. Ser. 3, XV, 317. K. acuminata, Done in Ann. Sc. Nat. Ser. 3, V, 316; Triana in Trans. Linn. Soc. XXVIII, 153.

MALACCA and SINGAPORE; not uncommon; many collectors.

I cannot see how K. acuminata, Done, is to be distinguished as a min and I reduce it here without any hesitation.

. Var. pubescens, King. Bases of leaves somewhat rounded and sub-cordate; young branches, under surfaces of leaves and panicles with much minute rusty pubescence. P. echinata, Jack, Wall. Cat. 4078a. Kibessia pubescens, Done in Ann. Sc. Nat. Ser. 3, V, 318; Triana in Linn. Trans. XXVIII, 152; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 552; Cogn. in DC. Mon. Phan. VII, 1108.

PENANG, MALACCA, PERAK.

I cannot see what claim this has to specific rank. To me it appears to be a variety and not a very distinct one of *P. echinata*, Jack. Wallich did not even regard it as a variety and issued it as true *P. echinata*. This form, in the three provinces where it occurs, appears to be very common.

3. Pterandra Griffithii, King, n. sp. A small tree; young branches cylindric, very little thickened at the nodes, glabrous. Leaves thinly coriaceous, elliptic to ovate-oblong, narrowed at the non-cordate (cordate in var.) base, the apex very shortly acuminate or acute, 3-nerved; both surfaces glabrous, shining; length 2·25-4 in.; breadth 1-2 in.; petiole 15-2 in. Flowers in 2-3- rarely 5-7-flowered, axillary, bracteolate cymes shorter than the leaves, rarely in crowded, terminal cymes; bracteoles ovate, acute, minute. Calyx-tube widely campanulate, 15 in. long, covered with adpressed, triangular, puberulous scales; the mouth with 4 large, blunt, triangular teeth. Petals orbicular-ovate, undulate, abruptly and shortly apiculate-spreading, not calyptrate. Stamens 8, equal; the anthers short, thick, about as long as the filaments, gibbous at the base behind, inserted at an obtuse angle on the filaments. Fruit globular-ovoid, truncate at the mouth, covered by the persistent scales, under 2 in. in diam.

MALACCA; Griffith (K.D.) 2272/1; PENANG; Curtis 953.

Griffith's specimens of this (2272/1) have been referred by M. Cogniaux (DC. Mon. Phan. VII, 1110) to Rectomitra tuberculata Bl., but comparison in the Kew Herbarium with two authentic specimens of that plant collected in Sumatra and 478

issued from the Leiden Herbarium shew that this differs from Blume's plant. Specimens of this were originally collected by Griffith in 1845, and as none had been gathered until Curtis's in 1886, the species is presumably a rare one.

VAR. cordata, King. Leaves with cordate bases. Penang; Curtis 453. Perak; Wray 1994.

### 18. MEMECYLON, Linn.

Shrubs or trees, glabrous. Leaves opposite, short-petioled or sessile, coriaceous or sub-coriaceous, orbicular, ovate or lanceolate, entire, pinuate-nerved or rarely 3-nerved. Flowers usually in small, axillary, rarely terminal, simple or panicled cymes or umbels. Calyx-tube campanulate, glabrous; limb dilated, truncate or shortly 4-lobed. Petals 4, blue or white, rarely reddish. Stamens 8, equal, filaments long; anthers short, opening by slits in front, connective ending in a horn behind. Ovary inferior, 1-celled; apex glabrous, surmounted by a convex or depressed disc with 8 radiating grooves; style filiform, simple; ovules 6-12, whorled on a free-central placenta. Berry globose or ellipsoid, crowned with the calyx-margin, 1-seeded. Seed large, cotyledons convolute.—Distrib. Species about 130; numerous in South-East Asia and its islands; a few extending into Polynesia and Australia, several in tropical Africa.

Leaves boldly 3-nerved from base to apex ... 1. M. oligoneuron.

Leaves with pinnate nervation, sessile or subsessile:—

Main nerves of leaves distinctly visible when dry, interarching but not forming (except in No. 3) a bold intramarginal nerve; leaves thinly coriaceous or membranous, small, not exceeding 4 in. in length:—

Young branches boldly 4-angled or winged; inflorescence very shortly stalked (the stalk not manifest):—

Young branches 4-winged :-

Cymes solitary, 3- or 4-flowered; leaves narrowly lanceolate, '6 to 1 in. broad ... ...

Cymes solitary, 8- to 10-flowered; leaves ovate- or oblong-lanceolate, 1'35 to 1'85 in. broad ...

Cymes several from the same axil, compoundly umbellate, 1'5 to 2'5 in. long, many-flowered, pubescent; leaves elliptic much narrowed to each end ... ... ...

Young branches 4-angled, never winged and some-

Young branches 4-angled, never winged and sometimes sub-terete:—

Cymes 3- to 5-flowered: leaves lanceolate, 1 to 2 in. broad ... ... ... ... ... ... ... ... Young branches terete; inflorescence with a manifest peduncle ... ... ... ... ... ... ... ...

2. M. epiphylicum.

3. M. fruticosum.

4. M. pubescens.

5. M. dichotomum.

6. M. Kunstleri.

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Main nerves of leaves distinct when dry, prominent on
the lower surface and anastomosing with a held intro
marginal line, coriaceous, more than 4 in, long :-
Inflorescence manifestly pedunculate:—
Peduncles several in each axil, many-branched; fruit
Alingoid
Podunalar ralitary from 1
Inflorescence sessile or on a very short peduncle:—
Flowers large, the mouth of the calyx 2 in. in diam.:—
Arboreous; leaves sub-acute; flowers in fascicles
of 12 to 20, their pedicels 15 in. long, stout; calyx
TRUBOATA not toothed
Shribby: leaves commington 9. M. Maingayi.
The control of the co
pedicels 4 in. long, slender; calyx-limb 4-toothed 10. M. Kurzii.
and the shiften of the carvy in deep win in diam
Leaves slightly narrowed or rounded at the base,
rarely minutely sub-cordate:-
Young branches not winged below the nodes;
main nerves of leaves 18 to 20 pairs; fruit '7 in.
in diam.
Toung branches with 4 short wings below each
node (sometimes obscure); main nerves 12 to 14
pairs; fruit 35 in. in diam.
Leaves distinctly cordate at the base and quite
sessile, amplexicant
The state of the s
dry; leaves corraceous of thinly so:
Leaves with broad cordate bases, sessile applevious.
branches terete, fruit large, globular
Branches 4-angled; fruit ellipsoid
Leaves much narrowed at the base, never cordate,
Postolato :—
Inflorescence in axillary glomeruli or in very shortly.
peduncted (not manifest) cymes:
Mouth of calyx entire in the expanded flower
Flowers in fascicles, their nedicals slander
leaves often 4 in. long; leaves brown underneath
when arv
Flowers in short umbellate sub-sessile cymes;
young branches bi-sulcate: fruit globular; leaves
Mouth of calyx 4-toothed:— 17. M. minutiflorum,
Teeth of calyx long, sharp, its fundus narrowed;
flower buds narrowly and narrowed;
flower buds narrowly conical; cymes many- flowered: fruit globalow 22
flowered; fruit globular, '2 in. in diam.; leaves shortly acuminate, 1.5 to 2.5 in. long 18. M anarchical
To notice I fill with the same of the same
diam.; leaves very acuminate, 2 to 2.5 in. long 19. M. laevigatum.

Teeth of calvx short, acute, its fundus rounded; fruit globular, '25 in. in diam.; flower pedicels with acicular bracteoles; leaves much acuminate, 2.8 to 5.5 in. long 20. M. cinereum. Inflorescence manifestly pedunculate:-Fruit ellipsoid:-Young branches terete; calvx-limb truncate; leaves elliptic-oblong or elliptic, 2.5 to 4.75 in. long 21. M. oleaefolium. Fruit globular :-Branches 4-angled :-Leaves rhomboid or elliptic-rhomboid; inflorescence under '5 in. long; calyx saucer-shaped with wide, minutely 4-toothed mouth; fruit 2 in, in diam. 22. M. pancislorum. Leaves oblong to elliptic, much tapered to each end; inflorescences 1 in. or more in length, several in each axil; calyx with narrow fundus, the mouth wide ('1 in.) and obscurely 4-toothed; fruit '5 in. in diam. 23. M. elegans. Branches terete:-Month of calyx with 4 broad, shallow teeth; flowers 4 to 6 in a compound umbel; fruit .25 in. in diam.; leaves caudate-acuminate 24. M. acuminatum. Mouth of calyx truncate or with 4 obscure teeth:-Cymes many flowered, on peduncles not longer than the leaf-petioles; calyx with wide, obscurely toothed mouth and narrow, cup-shaped tube; young branches not bi-sulcate 25. M. garcinioides. Cymes or peduncles very slightly if at all longer than the petioles; calyx not toothed; young branches deeply bi-sulcate under the 26. M. andamanicum. nodes Cymes or peduncles several times longer than the leaf-petioles :-Pedancles solitary; leaves thinly coria-27. M. intermedium. ceous ... Peduncles several from the same axil; leaves coriaceous ... 28. M. edule.

1. Memerylon oligoneuron, Blume, Mus. Bot. I, 354. A small tree or shrub; young branches slender, terete, their bark pale-brown. Leaves thinly coriaceous, brown below, greenish brown above when dry, oblong to ovate- or elliptic-oblong, shortly and obtusely acuminate, boldly 3 nerved from the cuneate base, transverse nerves invisible; length 2-4 in.; breadth 1.3-1.65; petiole .05-15 in. Flowers small

('05 in. long), on pedicels about '1 in. long, densely crowded in clusters on small tubercles in the axils of leaves or of fallen leaves. Calyx-tube cupular, but little contracted at the base, the mouth wide with four broad shallow teeth. Fruit unknown. Miq. Fl. Ind. Bat. I, pt. 1, 574; Cogn. in DC. Mon. Phan. VII, 1132. M. trinerve, Hassk. Cat. Hort. Bog. 259 (not of DC.). Myrtus oligoneura, Korth. ex Blume l.c. 354.

PERAK; Scortechini 1309; King's Collector 2513, 10280. PENANG

Curtis 1065, 1446, 2220, 10920. DISTRIB. Java, Borneo.

A species easily recognised by its 3-nerved leaves.

2. Memecylon epiphyticum, King, n. sp. An epiphytic shrub; branches rather stout, strongly angled and with short ear-like projections just below the nodes. Leaves thinly coriaceous, narrowly oblong-lanceolate, acute or acuminate, somewhat narrowed to the rounded sub-cordate base; main nerves 9 or 10 pairs, indistinct on the lower surface, invisible on the upper; length 1.75-3 in; breadth .6-1 in.; petiole .05 in. Cymes in pairs, axillary, 3-4-flowered, on slender pedicels .1-15 in. long, bracteate at the apex; pedicels half as long as the peduncle. Calyx-tube cupular, rounded at the base; the mouth deep and wide (.05 in. across), undulate, truncate. Fruit globular, smooth, .25 in. in diam.

Perak; on trees, King's Collector 5184; Wray 2727.

A species allied to M. dichotomum, Clarke, but with smaller leaves, more boldly angled branches, smaller, less numerous flowers, and cymes on more slender peduncles.

3. Memecylon fruticosum, King, n. sp. A shrub, 6-8 feet high; young branches boldly 4-winged especially near the slightly thickened nodes, the bark pale-brown. Leaves ovate-lanceolate or oblong-lanceolate, chartaceous, shortly acuminate, slightly narrowed to the rounded base; main nerves 7-9 pairs, interarching '15 in. from the margin, somewhat conspicuous on the lower but indistinct on the upper surface; length 3-4 in.; breadth 1·35-1·85 in.; petiole '05 in. Cymes usually in pairs, axillary, on short peduncles, 8-10-flowered. Flowers on pedicels with acute bracteoles at their bases. Calyx-tube shortly campanulate, tapering much to the base (obconic), the mouth '075 in. wide, with 4 shallow obscure teeth, or truncate; the buds not very conical. Fruit globose-ovoid, constricted below the thick persistent calyx-limb, '35 in. long and '25 in, in diam. (unripe).

PERAK; King's Collector 2971, 3265, 3425.

Approaching M. dichotomum and M. sub-dichotomum but with differently shaped fruit.

4. Memecylon pubescens, King. A tree, 30-70 feet high; young branches somewhat slender, pale-brown, 4-angled. Leaves coriaceous,

elliptic, shortly and abruptly acuminate, the base much narrowed; yellowish green on the lower surface and olivaceous on the upper when dry; main nerves 7-10 pairs, quite distinct on the lower surface, less so on the upper, curved and interarching 1 in. from the margin. Cymes 1-3 from the axils of leaves, often unequal, proliferously umbellate, from 1.5-2.5 in. long, always pedunculate, the peduncle and all its branches 4-angled, bracteolate at the divisions, sparsely and deciduously rusty-pubescent. Flowers densely clustered at the apices of the thickened secondary peduncles, pedicellate; the pedicels with numerous sharply acuminate bracteoles at their bases. Calyx-tube campanulate, much narrowed at the base, the mouth rather more than 05 in. wide, truncate but with 4 minute, acicular teeth. Fruit globular, 15 in. in diam. (unripe). M. grande, Retz., var. pubescens, Clarke in Hook. fil. Fl. Br. Ind. II, 558; Cogn. in DC. Mon. Phan. VII, 1153.

Malacca; Griffith (Kew Distrib.) 2336. Perak; King's Collector 6089, 10760. Singapore; Ridley 10390.

Ripe fruit of this is unknown.

5. MEMECYLON DICHOTOMUM, C. B. Clarke in Herb. Kew. slender shrub. 6-8 feet high; young branches slender, acutely 4-angled (even 4-winged) below the slightly thickened nodes; the bark palebrown. Leaves thinly coriaceous, almost sessile, lanceolate to ovatelanceolate, much acuminate, often caudate; the base rounded or slightly narrowed: main nerves 6-8 pairs, curved, interarching rather far from the margin, often indistinct; length 2.5-4 in.; breadth 1-2 in.; petiole very short (under '05 in.), Cymes 2-5-flowered, solitary, axillary and terminal; peduncles very short, 4-angled; pedicels with two ovate, acute bracteoles at their apices embracing the calyx. Calyxtube campanulate, tapering to the base (obconical); minutely glandular outside when dry, the mouth with 4 broad, shallow lobes when young, truncate and almost entire when old; buds rather large, conical. Fruit globular, crowned by the narrow calyx-limb, smooth when ripe, about '5 in. in diam. M. elegans, var. dichotoma, C. B. Clarke in Hook, fil. Fl. Br. Ind. II, 554; Cogn. in DC. Mon. Phan. VII, 1138.

Malacca; Griffith (Kew Distrib.) 2324; Maingay (K.D.) 818, 820. Ревак; Wray 2989; King's Collector 3239, 5036, 5297, 10783. Ранамс; Ridley 2609.

I restore for this species the MS. name originally given to it by Mr. C. B. Clarke in the Kew Herbarium. Mr. Clarke subsequently reduced it, as a variety, to *M. elegans*, Kurz, of which there were, at the time he made the reduction, no good specimens. Now that there are excellent examples of *M. elegans*, it is clear that *M. dichotomum* is not near that species.

There are specimens in the Calcutta Herbarium of what appear to be other species allied to this. But the material of all is imperfect and I describe none of them.

6. Memerylon Kunstleri, King, n. sp. A tree, 40-60 feet high; young branches slender, terete, very pale-grey. Leaves chartaceous, drying brown (palest on the lower surface), elliptic-oblong, bluntly acuminate, the base rounded and often minutely cordate; main nerves 7 or 8 pairs, ascending, faint on the lower and almost invisible on the upper surface when dry; length 2.75-4.5 in.; breadth 1-2 in.; petiole .05-1 in. Peduncles from the axils of fallen leaves or axillary, bracteolate, .35-6 in. long, umbellately panicled, bracteolate at the divisions, 4-angled like the pedicels; ultimate umbels 4-6-flowered, on the thickened ends of the secondary peduncles, pedicels bracteolate at the base. Calyx-tube cup-shaped, shallow, the mouth obscurely 4-toothed. Young fruit ellipsoid, crowned by the thick, shallow, obscurely 4-toothed limb of the calyx, .3 in. long, and .15 in. in diam.

PERAK; King's Collector (Kunstler) 8195, 10419.

This is known only by Mr. Kunstler's two suites of specimens. One of these sets bears no fruit; the other no flowers. The leaves on the former are rather smaller than those on the second but the venation is the same and I assume that they belong to one species. The terete branchlets, associated as they are with an inflorescence which is 4-angled in all its branches, even down to the pedicels and the ellipsoid fruit, distinguish the plant.

7. Memecylon caloneuron, Miq. Fl. Ind. Bat. Suppl. 321. A tree; branchlets and leaves as in M. costatum, Miq., but the latter with fewer nerves. Flowers in axillary, pedunculate, many-branched cymes, 1-2 in. long, the flowers in dense glomeruli on the thickened apices of the ultimate branchlets; all the peduncles boldly 4-angled or winged; fruit ellipsoid, 35 in. long (including the small persistent calyx-limb). M. costatum, Miq., var. ellipsoidea, Blume Mus. Bot. I, 361; Cogn. in DC. Mon. Phan. VII, 1136.

MALACCA; Maingay (Kew Distrib.) 813. PERAK; Wray 3235; King's Collector 6945, 8505. DISTRIB. Java; Sumatra, Forbes 2696; Borneo.

The inflorescence and fruit are so different from those of M. costatum, Miq., that I have followed Miquel in treating this as a species. Miquel did not however, recognise that his M. caloneuron really covers Blume's variety ellipsoidea of his own species M. costatum.

8. Memerylon Hullettii, King, n. sp. Young branches slightly ridged near the nodes, otherwise terete, the bark pale-brown. Leaves chartaceous, ovate-oblong, gradually narrowed to the acuminate apex; the base broad, abruptly rounded, slightly cordate; main nerves about 15 pairs, thin but distinct on the lower surface, horizontal; length 6-8 in.; breadth 2.25-3 in.; petiole under 1 in. Peduncle solitary, axillary, 1.5-2.5 in. long, slender, bearing at its apex a single or compound

few-flowered umbel; the flower-pedicels longer than the calyx and, like the peduncles of the secondary umbels, rugulose. Calyx-tube campanulate, narrowed to the base; the mouth truncate, with 4 very obscure shallow teeth. Fruit globular, crowned by the rather large calyx-limb, '25 in. in diam. (not quite ripe).

JOHORE; on Gunong Pulai, Hullett and King 253; Lake and Kelsall 4073.

A very well-marked species near *M. amplexicaule*, Roxb., at once distinguished by its elongately acuminate, broad-based leaves and long-peduncled nmbels.

9. Memerylon Maingayi, Clarke in Hook fil. Fl. Br. Ind. II, 557. A tree, 20-40 feet high; branches stout, terete, somewhat thickened at the nodes, the bark pale-brown when dry. Leaves coriaceous, nearly sessile, elliptic-oblong, sub-acute, slightly narrowed to the rounded, sometimes slightly cordate base; in length 6.5-9 in.; breadth 3-4.25 in.; main nerves 12-15 pairs, not very prominent, interarching inside the margin. Flowers large for the genus, in few-flowered (12-20) fascicles from the axils of the leaves or of fallen leaves; peduncles and pedicels about 15 in. long, bracteolate. Calyx-tube widely cupular, truncate, toothless, 2 in. in diam. when dry. Petals obtuse in bud. Fruit unknown. Cogn. in DC. Mon. Phan. VII, 1139.

MALACCA; Maingay (Herb. prop.) 1422. PERAK; King's Collector 4726.

An arboreal species with large flowers and thick branches, allied to M. amplexicaule but well distinct.

10. Memecylon Kurzh, King. A glabrous shrub; young branches terete, swollen under the nodes, the bark pale when dry. Leaves thinly coriaceous, sub-sessile, ovate-oblong, shortly acuminate, slightly narrowed to the rounded base; main nerves 15-20 pairs, rather straight, interarching '25 in. from the margin, faint; length 8.5-10 in.; breadth 3.25-4.5 in.; petiole about '1 in. long, stout. Flowers large, on slender bi-bracteolate pedicels '4 in. long; the cymes 3- or 4-flowered, from the axils of fallen leaves, solitary or several together; peduncle short (only '15 in. long). Calyx-tube campanulate, '2 in. long; the mouth '2 in. wide, wavy and with 4 broad teeth. Fruit ellipsoid, somewhat curved, '75 in. in length (including the persistent limb of the calyx) and '4 in. in diam. M. subtrinervium, Miq., var. grandiflora, Kurz in Journ. As. Soc. Beng. 1876, pt. II, 131; C. B. Clarke in Hook. fil. Fl. Br. Ind. 11, 565; Cogn. in DC. Mon. Phan. VII, 1143.

NICOBAR ISLANDS; Kurz, King's Collector 509.

The leaves of this when dry are pale-brown on the upper and pale-olivaceous on the lower surface. They are different in shape from those of M. subtrinervium, Miq., of which Kurz makes this a variety. The flowers of the latter are moreover small and in slender pedunculate cymes.

MEMECYLON HETEROPLEURUM, Blume, Mus. Bot. Lugd. Bat. I, 362. A tree, 30 and 40 feet high; young branches rather slender, terete, the bark pale-brown or cinercous when dry. Leaves thinly coriaceous, broadly oblong-lanceolate or elliptic-oblong, shortly and rather bluntly acuminate, the base rounded or narrowed, not cordate, shortly petiolate, pale-brown with sometimes a touch of green on both surfaces when dry; main nerves 18-20 pairs, straight, interaching close to the margin, thin but very distinct on the lower surface when dry; length 5-7 in. rarely 10 in.; breadth 2-3.5 in.; petiole only 1 in. Flowers pointed in bud, in dense cymes from the axils of the leaves or from those of the old leaves; the peduncle 25 in long; pedicels shorter, bi-bracteolate. Calyx-tube widely cupular, narrowed to the base, truncate, 1-15 in. in diam. when dry. Fruit globular, '5 in. in diam. Miq. Fl. Ind. Bat. I, pt. I, 579; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 557; Cogn. in DC. Mon. Phan. VII, 1140.

MALACCA; Griffith 2337 (Kew Distrib.); Maingay (K.D.) 816. PENANG; Curtis 814. SINGAPORE and SELANGORE; Ridley. PERAK; King's Collector, Wray, Scortechini: many Nos.; common. DISTRIB.

and Borneo.

VAR. olivacea, King. Leaves rounded at the base, large, 10-14 in. long and 3.5-4.25 in. broad, with a strong olivaceous tint when dry: fruit not seen.

Perak; King's Collector 500, 2778, 10872; Wray 1310.

This variety differs (as far as it is represented by dried specimens) from typical M. heteropleurum, Bl., only in the size of its leaves and their colour when dried; fruit of it is unknown, the flowers and shape of leaves are exactly those of the type.

12. MEMECYLON COSTATUM, Miq. in Verh. Ned. Inst. 1850, p. 29. A tree, 30-60 feet high; young branches terete, but with 4 short wings below the nodes. Leaves thinly coriaceous (drying pale-brown with a tinge of yellowish-green), oblong- or oblong-lanceolate, sometimes oblong-ovate, shortly acuminate, the base rounded or slightly narrowed, not cordate, penni-nerved; the main nerves 12-14 pairs, stout, curved, anastomosing at 25 in from the margin with a bold lateral nerve; length 4.5-7.5 in.; breadth 1.75-3 in.; petiole very short, stout. Flowers crowded in axillary glomeruli, 1 in. or less in diameter; their pedicels short (1-05 in.), the bracteoles minute, triangular. Calyx cup-shaped, truncate, slightly narrowed at the base. Petals 2 in. in diam. Fruit globose, 35 in. in diam. Miq. Fl. Ind. Bat. I, pt. I, 573; Triana in Linn. Trans. XXVIII, 157; Blume, Mus. Bot. I, 360; C. B. Clarke in Hook fil. Fl. Br. Ind. II, 558; Cogn. in DC. Mon. Phan. VIII, 1136. M. grande, Bl. Bijdr. 1095 (not of Retz.).

Perak; King's Collector 10785. DISTRIB.; Java, Sumatra (Forbes

1442).

13. MEMECYLON AMPLEXICAULE, Roxb. Fl. Ind. II, 260. A shrub, 8-12 feet high; branches rather slender, terete between, but 4-angled and sometimes 4-winged below the nodes. Leaves (tinged with greenishvellow when dry) sessile or nearly so, often semi-amplexicanle, ovateoblong or ovate-lanceolate, sub-acute or shortly and bluntly acuminate, broadest a little above the cordate base, penni-nerved; the main nerves 9-12 pairs, not prominent, interaching inside the margin; length 3.5-6 in.; breadth 1-25 in. Flowers 2 in. long, crowded in dense, axillary glomeruli 1 in. or less in diameter; their pedicels very short (lengthened to 25 in. in fruit) and with minute bracteoles. Calyx campanulate, truncate, much narrowed to the base. Petals sub-rotund. ·2 in. in diam. Fruit globose, ·3 in. in diam. Wight Ic. 279. Naud. in Ann. Sc. Nat. Ser. 3, XVIII, 277; Miq. Fl. Ind. Bat. I, pt. I, 580; C. B. Clarke in Hook, fil. Fl. Br. Ind. II, 559 (in part); Cogn. in DC. Mon. Phan. VII, 1139 (in part). M. depressum, Benth. in Wall. Cat. 4101 (in part); Triana in Linn. Trans. XXVIII, 158 (in part). M. cordatum, Wall. Cat. 4100 (in part). M. coerulum, Triana in Linn. Trans. XXVIII, 158 (in part).

In all the Provinces except the Andaman and Nicobar Islands; common.

The petals of this are white tinged with pink. The plant described by Roxburgh under the name M. amplexicaule is a Malayan one, as he distintly states. The species from the South of India which has, in most of the synonyms above quoted, been treated as identical with this is, in my opinion, quite distinct. It has smaller and proportionately broader leaves, and the flowers, which are smaller and more numerous, are in fascicles from the axils of fallen leaves. This is allied to M. costatum, and like it, this has the stems often 4-winged below the nodes; the leaves are also sessile or nearly so, but they differ from those of M. costatum in invariably being cordate at the base.

14. Memericon microstomum, Clarke in Hook fil. Fl. Br. Ind. II, 557. A tree, 40-70 feet high; branches terete, rather slender, dark greyish-brown when dry. Leaves very coriaceous, sessile and almost amplexicaul, oblong or narrowly elliptic, sub-acute or obtuse, the base rounded and slightly cordate, very opaque, the nerves very indistinct; length 3.25-4.5 in.; breadth 1.3-2 in. Flowers numerous, small, less than 1 in long (excluding the exserted stamens), crowded in dense axillary glomeruli, pedicels filiform. Calya-tube infundibuliform, constricted in its lower third, the mouth wide truncate. Petals pale yellowish-green. Fruit large (6 in. in diam.), globular, the persistent calyx-limb small. Cogn. in DC. Mon. Phan. VII, 1147.

MALACCA; Maingay (Kew Distrib.) 821; PERAK; Wray 1137; King's Collector 10588. SINGAPORE; Ridley 2033. PENANG; Curtis 766.

The leaves of this, when dry, are olivaceous on the upper and pale-brown on the lower surface. The species resembles M. amplexicaule but differs notably in its large globular fruit.

MEMECYLON COERULEUM, Jack. in Mal. Misc. I, 26. A shrub, 5-15 feet high; branchlets often 4-angled near the apices, otherwise terete, slender, the bark pale-brown when dry. Leaves sessile, coriaceous, opaque, oblong or ovate-oblong, obtuse or sub-acute, broadest a little above the rounded, cordate base, the midrib distinct but the main nerves faint and the reticulations obsolete; length 2.5-4.75 in.; breadth 1-2.5 in. Flowers rather numerous, in dense, axillary, condensed glomerulate cymes, the peduncle 25 in. long, the pedicels shorter than the flowers, each with two broad, acute bracteoles. Calyx-tube short, widely campanulate, narrowed to the base, the mouth wide truncate. Petals conical in bud. Fruit narrowly ellipsoid, 4 in. long and 25 in. in diam. (including the deep, persistent calyx-limb). Miq. Fl. Ind. Bat. I, pt. I, 580; Triana in Linn. Trans. XXVIII, 158 (excl. syn. M. amplexicaule, Roxb.); Kurz, For. Flora B. Burma I, 511; C. B. Clarke in Hook. fil. Fl. Br. Ind. I, 559; Cogn. in DC. Mon. Phan. VII, 1163. M. grande, Smith in Rees' Cyc. XXIII (not of Retz). M. cordatum, Wall. Cat. 4100 (partly); Griff. Not. IV, 673. M. manillanum, Naud. in Ann. Sc. Nat., Ser. 3, XVIII, 276; Miq. 1.c. 576. M. lutescens, Presl. Epim. Bot. 208 (not of Naud.).

In all the provinces; not uncommon. DISTRIB. Philippines.

16. Memecylon campanulatum, Clarke in Hook. fil. Fl. Br. Ind. II, 563. Young branches rather slender, terete, their bark pale-brown. Leaves coriaceous, elliptic, sometimes with a short blunt apical point, the base always much and abruptly narrowed, nerves invisible; length 3-4-5 in.; breadth 1·25-2·2 in.; petiole ·1-15 in. Flowers on slender pedicels, 1-15 in. long, bracteolate at the base and crowded in dense fascicles in the axils of the leaves or of the fallen leaves, the buds of the petals shortly conical. Calyx-tube campanulate, blunt at the base and somewhat contracted below the wide truncate limb. Fruit nuknown. Cogn. in DC. Mon. Phan. VII, 1162.

MALACCA; Griffith (Kew Distrib. 2325).

In its leaves this much resembles M. oleafolium, Bl., but the flowers of that species are in lax, few-flowered, pedunculate umbels, whereas the flowers of this are in dense, epedunculate fascicles.

17. Memberson minutification, Miq. Fl. Ind. Bat. Suppl., 323. A tree, 30-70 feet high; young branches slender, with a broad, angularly margined groove on each side; the bark pale, smooth. Leaves thinly corraceous, drying yellowish-green beneath, narrowly elliptic, cordate-acuminate, the base much narrowed; main nerves very indistinct.

Inflorescence twice as long as the petioles, many-flowered; the peduncles often two or three from the same axil, each bearing several 2-4-flowered umbels; pedicels stout, bracteolate at the base. Calyx-tube cup-shaped, not tapered to the base, the mouth expanded, truncate and '05 in. wide, glandular-hairy when young like the bluntly conical petal-bud and the pedicels. Fruit crowned by the minute calyx-limb, depressed globular, smooth, '35 in. in diam. and '3 in. deep. Cogn. in DC. Mon. Phan. VII, 1169. M. acuminatum, Sm., var. flavescens, Clarke in Hook. fil. Fl. Br. Ind. II, 562; Cogn. in DC. Mon. Phan. VII, 1152.

MALACCA; Griffith (Kew Distrib.) 2325/2. Penang; Curtis 815. Perak; King's Collector 5027, 6105, 6265, 8724. Distrib. Sumatra.

Triana considers this a distinct species and I think he is right. Fruit however is wanting to complete our knowledge of the form. The Perak specimens agree perfectly with the type sheet named M. minutiflorum, Miq., in Herb. Calcutta. The species is not, as was suggested by Kurz, identical with M. lilacinum, Zoll. and Moritzi.

18. Memecylon Myrsinoides, Blume, Mus. Bot. I, 356. A tree, 30-40 feet high (rarely a shrub); young branches terete, slender, with pale-grey bark. Leaves thinly coriaceous, drying brown (palest on the lower surface), narrowly elliptic or ovate-lanceolate, the apex very acuminate, much narrowed to the cuneate base; main nerves invisible on both surfaces; length 1·5-2·5 in.; breadth ·9-1·25 in.; petiole ·15-25 in. Flowers numerous, in very short-peduncled cymes, densely clustered together in the same axil; pedicels about the length of the calyx, bracteolate at the base. Calyx-tube campanulate, much narrowed to the base, the mouth less than ·05 in. wide, with 4 long (for the genus) acute teeth; petals in bud forming a long narrow cone, acuminate. Fruit globular, the size of a grain of black pepper. Miq. Fl. Ind. Bat. I, pt. I, 577; Triana in Linn. Trans. XXVIII, 158 (excl. syn.); Cogn. in DC. Mon. Phan. VII, 1160; excl. syn. M. lilacinum. M. capitellatum, Blume, Bijdr. 1091 (not of Linn.).

Penang; Curtis 2219. Johore; Ridley 2026. Perak; Wray 2258; King's Collector 1851, 3517, 5923, 8828. Distrib.; Sumatra; Forbes 353; Java; Bangka.

Var. lilacina, King. Young branches with two deep, sharplyargined grooves; leaves broadly elliptic, yellowish on the under surface when dry, cymes not crowded (only two in an axil). M. lilacinum, Zoll. & Mor. Syst. Verzeich., 9; Naud. in Ann. Sc. Nat. Ser. 3, XVIII, 281; Mig. Fl. Ind. Bat. I, pt. I, 575.

Penang; King's Collector 1457; Curtis 100. Singapore; Ridley 6218. Perak; King's Collector 10442. Distrib.; Java, Zollinger 178.

19. MEMECYLON LAEVIGATUM, Blume, Mus. Bot. Lugd. Bat. I, 358. A small tree; young branches very slender, terete, the bark pale. Leaves thinly coriaceous, broadly ovate or elliptic, more or less rostrateacuminate, the base cuneate; main nerves obscure; length 2-2.5 in.; breadth 1-1.75 in., petiole 1-15 in., opaque, when dry dull darkbrown, the lower surface slightly paler than the upper. Cymes mostly from the nodes of fallen leaves, small, few-flowered, the peduncle very short (1 in. long), pedicels also very short. Flowers small (less than 1 in. long), their buds pointed; calyx-tube campanulate, much tapered to the base, the mouth with 4 acute, small teeth. Fruit globular, 3 in. Miq. Fl. Ind. Bat. I, pt. I, 576; Triana in in diam., smooth. Linn. Trans. XXVIII, 157; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 561 (excl. VARS.); Kurz, For. Flora. I, 513; Cogn. in DC. Mon. Phan. VII, 1159. M. Myrilli, Blume, Mus. Bot., 357; Miq. l.c. M. pachyderma, Wall. Cat. 4104. M. Vosmaerianum, Scheff. in Flora, 1870, 249.

MALACCA; Ridley 1767. SINGAPORE; Ridley 1815, 1906, 2026, 4805. PERAK; Scortechini 81; Wray 2091; King's Collector 3768. SELANGORE; Ridley 2024. DISTRIB.; Burma, Helfer 2328; Wallich 4104; Bangka, Java, Borneo.

20. Memecylon cinereum, King, n. sp. A shrub; young branches rather slender, terete, sulcate on two sides, the bark dark-cinereous when dry. Leaves coriaceous, drying very dark cinereous-brown on the upper surface, somewhat paler on the lower, lanceolate or ovatelanceolate, much acuminate, the base rounded but more often cuneate; main nerves 8-10 pairs, invisible on both surfaces or nearly so, length 2.8-5.5 in.; breadth 1-2.2 in.; petiole 15-3 in. Peduncles axillary or from the leafless nodes, not much longer than the petioles, glomerulate, many-flowered; pedicels short, stout, with small acicular bracteoles at the base. Calyx-tube cupular, with a rounded base; the mouth expanded, 1 in. wide, undulate and with 4 acute, triangular teeth. Fruit globular, the persistent calyx-limb small, 25 in. in diam., smooth.

PERAK; Scortechini 394, 2035; King's Collector 3143, 10758.

21. Memecylon oleaffolium, Blume, Mus. Bot. I, 359. A tree, 30-60 feet high; young branches rather slender, terete, smooth, the bark very pale. Leaves coriaceous, elliptic-oblong or elliptic, the apex obtusely acuminate, the base much narrowed, when dry of a pale olivaceous-brown colour on both surfaces, the upper the darker; main nerves 8-10 pairs, obscure; length 2.5-4.75 in.; breadth 1-2.25 in.; petioles 15 to 3 in. Peduncles 1-3 in one leaf-axil, several times longer than the petiole (elongating in fruit), bearing at the apex 490



numerous, crowded, 2-3-flowered umbellules with a semi-circular bract at the bases of their short, stout, 4-angled peduncles. Flowers with conical buds, less than 'l in. in diam., on slender pedicels longer than themselves, bracteolate at their bases. Calyx hemispheric; the mouth truncate, entire. Fruit ovoid-elliptic, crowned by the short calyx-limb, '4 long and '25 in. in diam. Miq. Fl. Ind. Bat. I, pt. I, 579 (excl. syn.); Cogn. in DC. Mon. Phan. VII, 1150. M. Horsfieldii, Miq. Fl. Ind. Bat. I, pt. I, 572. M. grande, Retz, VAR. Horsfieldii, Clarke in Hook. fil. Fl. Br. Ind. II, 558; Cogn. in DC. Mon. Phan. VII, 1153 (excl. syn. M. celastrinum, Kurz from both). M. lampongum, Miq. Fl. Ind. Bat. Suppl. 321.

MALACCA; Maingay (Kew Distrib.) 811. SINGAPORE; Ridley 6414. Perak; Scortechini 2069; King's Collector 426, 5187, 4420, 4439, 8571. Distrib. Bangka; Horsfield; Sumatra; Forbes 3213.

This has been treated by Messrs. Clarke and Cogniaux as a variety of M. grande of Retz, a species originally described by its author from specimens sent to him by Koenig, who collected in Southern India. Retz's description is very short and, as Mr. Clarke points out, would suit several species. The species of Memecylon have not, as a rule, a wide distribution, and very few indeed of them are common to S. India or Ceylon and to the Malay Peninsula. I think it, therefore, in the absence of his type specimen, advisable to consider Retz's name as properly belonging to the Ceylon plant represented by Thwaites's C.P. 3442. Both Messrs. Clarke and Cogniaux treat as belonging to typical M. grande, Retz, the Singapore plant issued by Wallich as No. 4472 of his Catalogue under the name M. laxiflorum. This plant is now represented only by fruiting specimens which do not, in my opinion agree with any other Memecylon in Herb. Kew. The inflorescence in Wallich's specimens is 2.5 in, long, pedunculate, and laxly compound-umbellate. When flowers shall be forthcoming it will probably be found necessary to let the species M. laxiflorum stand good.

Thwaites's C.P. which I assume, in the absence of a type specimen, to be equal to the type of *M. grande*, Retz, does not in my opinion resemble the four forms which the two distinguished botanists just mentioned agree in treating as varieties of it, sufficiently closely to warrant such treatment of the latter. I would venture to dispose of them as follows:—

Var. Horsfieldii = M. oleaefolium, Bl. Var. khasiana = M. celastrinum, Kurz. Var. pubescens = M. pubescens, King. Var. merguica = M. merguica, King.

M. Cogniaux has inadvertently described the fruit of M. oleaefolium as globose, whereas in his original description of it Blume writes "fructibus ellipsoideis."

22. Memecylon pauciflorum, Blume, Mus. Bot. I, 356. A small tree; young branches 4-angled, slender, pale-brown. Leaves coriaceous, rhomboid or elliptic-rhomboid, drying brown, the lower surface paler, the apex blunt and often retuse, the base acute or subacute; nerves 6 or 7 pairs, invisible or very faint; length 1-1.5 in.; breadth 35-1 in.; petiole under 1 in. Cymes umbellate, axillary, on slender peduncles 1-2 in. long; flowers 7-10, small, on slender pedicels bracteolate at the base

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and about '15' in: long. Calyx-tube shortly campanulate, or saucer-shaped, with a large, wide, sharply and minutely 4-toothed mouth. Petals acuminate. Stamens and style much exserted. Fruit depressed-globular, smooth, crowned by the toothed calyx, '2 in. in diam. Miq. Fl. Ind. Bat. I, pt. I, 578; Kurz, For. Flora Burma I, 514; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 555; Cogn. in DC. Mon. Phan. VII, 1169. M. capitellatum, Spanoghe in Linnaea, XV, 203 (not of Linn.). M. umbellatum, Benth. Fl. Austral III, 293 (non Burm.). M. australe, Muell. ex Triana in Linn. Trans. XXVIII, 159.

Andaman Islands; very common. Distrib. Burma (Helfer 2332); Chittagong; Australia; Timor.

The Penang specimens have narrower, less rhomboid leaves than those from the Andamans.

23. Memerylon elegans, Kurz in Journ. As. Soc. Beng. 1872, pt. II, 307. A glabrous shrub; young branches slender, boldly 4-angled, sometimes winged, the bark pale. Leaves coriaceous, pale yellowish, the upper surface tinged with green when dry, oblong to elliptic, much acuminate, the base very cuneate; main nerves invisible or very indistinct; length 3.5-5.5 in.; breadth 1.4-2 in.; petiole 15-3. Flowers 15 in. long, their pedicels longer, (2 in.), slender, angled. Cymes axillary, several together, pedunculate, simply or trichotomously umbellulate; peduncles 3-75 in. long, 4-angled. Calyx-tube somewhat large for the genus, cup-shaped, narrowed to the base, 1 in. wide at the undulate, obscurely 4-lobed mouth. Petals blue, broadly ovate, acuminate. Fruit globular, smooth, 5 in. in diam. Kurz, For. Flor. Burma I, 514; C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 554; Cogn. in DC. Mon. Phan. VII, 1138.

Andaman Islands; very common.

VAR. minor, King. Cymes usually solitary, the pedicel slender, short; fruit only 2 in. in diam. (? ripe); leaves 2-3 in. long.

Andamans; King's Collectors.

Smaller than the typical form in all its parts. The flower buds also differ somewhat from those of the typical form.

24. Memecylon acuminatum, Smith in Rees Cyclop. XXIII, 4. A tree, 30-50 feet high; young branches slender, terete, the bark brown, smooth. Leaves thinly coriaceous, drying pale olivaceous-brown, the surfaces concolourous, ovate to ovate-lanceolate, caudate-acuminate, the base caueate; main nerves invisible; length 1.5-2.25 in.; breadth 8-1.4 iu.; petiole 1-15 in. Cymes solitary or in pairs, axillary, umbellate, on peduncles several times longer than the petioles. Flowers 6-8 in a compound umbel; pedicels bracteolate at the base, slender, 402

twice as long as the flowers. Calyx-tube cup-shaped, the fundus broad, slightly constricted below the thick, short, undulate, broadly 4-toothed limb. Petals conical in bud. Fruit globular, somewhat depressed, smooth, crowned by the narrow calyx-limb, 25 in. in diam. Triana in Trans. Linn. Soc. XXVIII, 158; DC. Prodr. III, 6; Clarke in Hook. fil. Fl. Br. Ind. II, 562; Cogn. in DC. Mon. Phan. VII, 1152 (excl. VAR. flavescens).

MALACCA; Grifith (Kew Distrib.) 2325; Maingay 810; Derry 1041; Ridley 3297, 3298, 4574. Johore; Ridley 4656. Perak; King's Collector 3458, 6754.

25. Memecylon garcinioides, Blume, Mus. Bot. I, 358 (excl. var. B). A tree, 20-40 feet high; young branches terete, slender, pale-brown. Leaves thinly coriaceous, oblong-ovate or elliptic, abruptly and rather obtusely acuminate, the base cuneate, drying pale-brown tinged with olive, the under surface the palest; main nerves invisible; length 3-55 in., breadth 1·2-2 in.; petiole ·05-1 in. Cymes axillary and in the axils of old leaves, umbellate, many-flowered, on short peduncles (·2 in. long, longer in fruit); pedicels slender, bracteolate at the base, ·1-·15 in. long. Flower-buds acute. Calyx-tube small and cup-shaped, the mouth very wide (nearly ·1 in.), truncate, but with four minute, acute teeth. Fruit globular, smooth, pale when dry, ·2 in in diam. Cogn. in DC. Mon. Phan. VII, 1152.

Malacca; Derry 1240. Maingay (Kew Distrib.) 817. Perak; Scortechini 2033; Wray 2961, 3203; King's Collector 1984, 2938, 7123, 10034; Singapore; Ridley 8118. Selangore; Ridley 7333. Distrib. Sumatra, Blume, Forbes 2970, 3108; Borneo, Beccari 536.

26. Memecylon and an anicum, King, n. sp. A shrub; young branches slender with faint grooves below the nodes, the bark palebrown. Leaves chartaceous, brown on the upper and greenish-yellow on the lower surface when dry, oblong-lanceolate, gradually and bluntly acuminate, the base cuneate; main nerves 10-12 pairs, interarching near the edge, sub-horizontal; length 2·25-3 in.; breadth ·75-1 in.; petiole ·25-3 in. Peduncles unequal, ·2-4 in. long, in pairs in the axils of leaves or of fallen leaves, bearing at their apices several 3-5-flowered umbels, bracteolate at the divisions, flower-pedicels as long as the calyx, minutely bracteolate at the base. Calyx-tube campanulate, tapered below, the mouth truncate, nearly ·2 in. wide. Bud of petals conical. Fruit depressed-globular, crowned by the small calyx-limb, yellowish, ·2 in. in diam.

Andaman Islands; King's Collectors, 357, 452. NICOBAR ISLANDS.

A species with leaves somewhat like those of M. garcinioides, Bl., but narrower. In its inflorescence it resembles M. acuminatum, Sm., but the peduncles are longer

than in that species. The inflorescence also resembles that of *M. intermedium*, Bl., but when young it is covered with a yellow waxy coat; the pedicels and peduncles are moreover much shorter than in *M. intermedium*. The leaves resemble those of the latter species in shape but are of a thinner texture so that the nerves are visible though faint.

27. MEMECYLON INTERMEDIUM, Blume, Mus. Bot. I, 358. 20-40 feet high; young branches slender, terete, pale cinereous. Leaves thinly coriaceous, broadly ovate, shortly and bluntly acuminate, the base cuneate, greenish above and brown beneath when dry; main nerves invisible or nearly so; length 2.75-3.5 in.; breadth 1.25-2 in.; petiole 25-35 in. Cymes large, crowded, in the axils of leaves or of fallen leaves, usually in pairs, on peduncles several times longer than the petioles, compoundly umbellate; pedicels slender, bracteolate at the base, 1 in. long. Calyx-tube cup-shaped, with a wide, truncate, edentate or minutely toothed limb. Fruit not seen (globose fide Cogniaux). Triana in Linn. Trans. XXVIII, 157; C. B. Clarke in Hook, fil. Fl. Br. Ind. II, 561; Cogn. in DC. Mon. Phan. VII, 1158. M. umbellatum, Blume, Bijdr. 1094 (not of Burm.) Naud. in Ann. Sc. Nat. Ser. 3, XVIII, 273; Miq. Fl. Ind. Bat. I, pt. I, 575. M. garcinioides, Bl., VAR. elongatum, Blume, Mus. Bot. I, 358.

PERAK; Scortechini 1036. DISTRIB. Sumatra; Java.

This resembles M. garcinioides, Bl., very closely, but differs in inflorescence, the cymes of this being larger, on longer peduncles.

28. Memerican edule, Roxb., Corom. Plants I, t. 82. A shrub or small tree; young branches terete, pale when dry. Leaves coriaceous, drying brown, the lower surface paler, both often with an olivaceous tinge, elliptic or ovate, the apex sub-acute or shortly and bluntly acuminate, the base usually cuneate but sometimes rounded; main nerves 5-8 pairs, very inconspicuous, ascending; length 2-4 in.; breadth '85-2'25 in.; petiole '1-35 in. Peduncles several together, unequal in length, longer than the petioles, axillary, umbellately cymose, many-flowered; pedicels longer than the calyx. Calyx-tube cupular, narrowed to the base, the limb truncate, sometimes obscurely 4-toothed. Fruit globular, crowned by the small calyx-limb, '25 in. in diam.

Only two of the numerous varieties of this species occur in our region. These are as follows:—

VAR. 1. typica. Leaves usually under 3 in. long, dull, tinged with yellow when dry, acute or obtuse. M. edule, Roxb. Fl. Ind. II, 260; DC. Prodr. III, 6; Wall. Cat. 4107; Dalz. & Gibs. Bomb. Fl. 93; Kurz, For. Fl. I, 512. M. edule, VAR. a, Thwaites Enum. 111. M. umbellatum, Burm. Fl. Zeyl. t. 31. M. tinctorium, Kon. ex W. & A. Prodr. 319; Wight Ill. t. 31. M. globiferum, Wall. Cat. 4108. M. pyrifolium, Naud. in Ann. Sc. Nat. Ser. 3, XVIII, 277.



SINGAPORE; Ridley 4084, 6054. MALACCA; Griffith (Kew Distrib.) 2327; Maingay (K.D.) 812; Derry 1028. KEDAH; Ridley 2627. Curtis 2627. DISTRIB. India, Ceylon.

Var. 2. ovata, C. B. Clarke in Hook. fil. Fl. Br. Ind. II, 563. Leaves large, often 4-4.5 in. long, acute or acuminate at the apex, the base rounded or cuneate, shining when dry; fruit black when ripe and somewhat succulent. M. ovatum, Sm. ex Kurz, For. Fl. I, 512. M. edule, var.  $\gamma$ , Thwaites Enum. 110. M. umbellatum, Hb. Heyne in Wall. Cat. 4109. M. tinctorium, var.  $\beta$ , W. & A. Prodr. 319. M. prasinum, Naud. in Ann. Sc. Nat. Ser. 3, XVIII, 275. M. grande, Wall. Cat. 4103, partly. M. lucidum and M. pyrifolium, Presl. Epim. Bot. 209, 210.

ANDAMAN ISLANDS; not common. NARCONDAM and GREAT COCO ISLANDS; Prain. Perak; King's Collector 4175; Scortechini 947. Penang; Curtis 723. SINGAPORE; Ridley 6532. DISTRIB. India, Malayan Archipelago.

#### DOUBTFUL SPECIES.

M. anabile, Bedd. VAR. malaccensis, Clarke in Fl. Br. Ind. II, 555. This is founded by its author on the very imperfect material afforded by Maingay's specimens (Kew Distrib. 819).

M. laxiflorum, Wall. Cat.; see note under M. oleaefolium, Blume.

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### MATERIALS

FOR A

# FLORA OF THE MALAYAN PENINSULA.

SIR GEORGE KING, K.C.LE., M.B., LL.D., F.R.S.,

LATE SUPERINTENDENT OF THE ROYAL BOTANIC GARBEN, CALCUTEA.

[Reprinted from the Journal of the Asiatic Society of Bengal, Vol. L.XX. Part II, No. 1, 1901.]

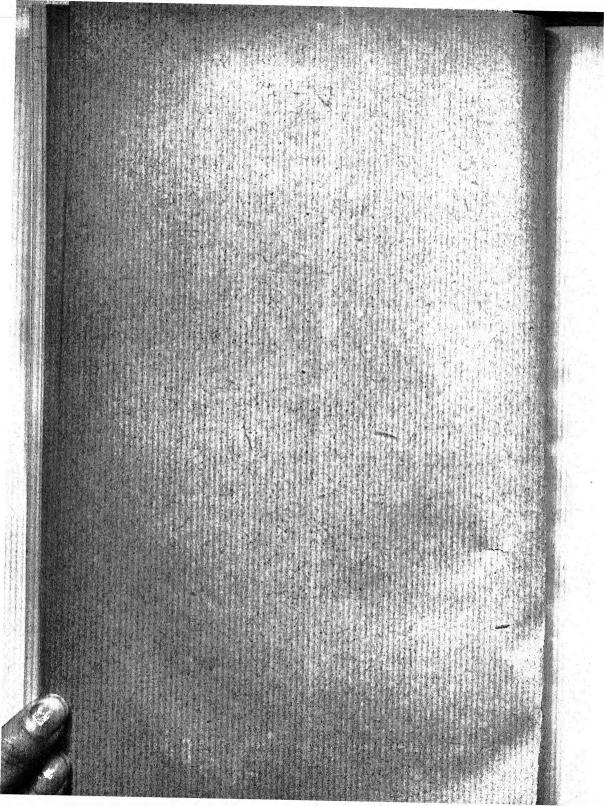
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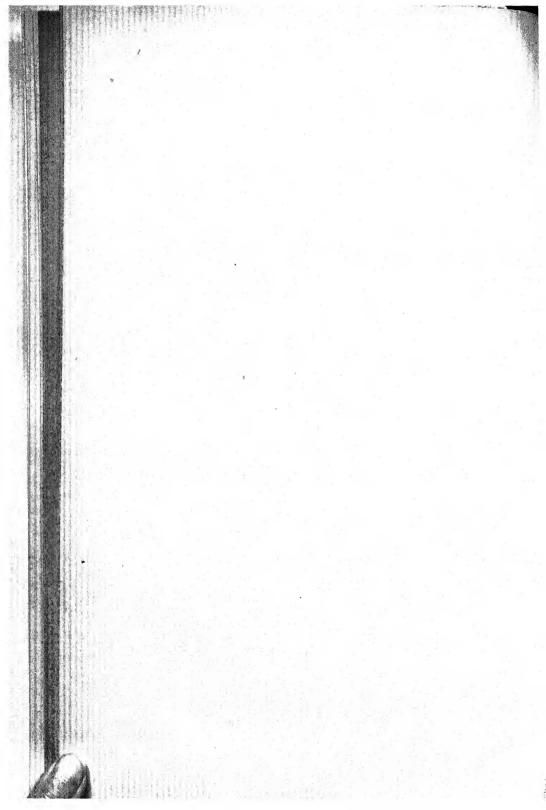
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66 From the Journal, Asiatic Society of Bengal, Vol. LXX, Part II, No. 1, 1901.

V.—Materials for a Flora of the Malayan Peninsula.—By Sir George King, K.C.I.E., LL.D., F.R.S., &c., late Superintendent of the Royal Botanic Garden, Calcutta.

[Received April 2nd; Read June 5th, 1901.]

#### No. 12.

The present contribution to these Materials is occupied exclusively by an account of the Natural Order Myrtaceæ. In the sequence followed in Hooker's Flora of British India, which has been adopted in these papers, this family ought to have immediately preceded Melastomaceæ. But, for reasons which are of no importance to any one besides the author, the account of the latter order was prepared first and was published in the eleventh of these papers. In the present paper 122 species, belonging to 11 genera, are described. Six of these genera are represented by only a single species; two of them by 2 species; one by 5, one by 11, and the remaining one (Eugenia) by no fewer than 96 species. The latter genus is a very perplexing one, from the fact that the species resemble each other so closely. It is impossible to limit the genus by really good well-marked characters, and it is equally impossible to divide it into sub-genera by characters which do not break down. Eugenia seems to be essentially a genus in the evolution of which an extraordinary number of the successive forms have been preserved. I have adhered to the arrangement of the species into the groups Jambosa and Syzygium, although there are many species which might be referred to either. Nobody can be more dissatisfied than I myself am with the clavis of the species which I have prepared. In fact, while dealing with this genus and with its literature, the belief has been forced upon me that verbal descriptions are of very little use in identifying the species, and that the only safe way of doing so is by comparison with authentically named Herbarium specimens.

#### Order XLVI. MYRTACEÆ.

Trees or shrubs, rarely herbs. Leaves opposite, seldom alternate or whorled, petioled, simple, entire, rarely denticulate or crenate, 3-nerved or pinnately-nerved and usually with an intramarginal nerve, generally coriaceous, and dotted with pellucid glands. Stipules if present small and decidnous. Flowers regular, very rarely irregular, hermaphrodite, or polygamous by abortion, axillary, solitary or in spikes cymes corymbs or heads, naked or with an involucre, often with 2 bracts at the base, white, pink, purple, or yellow, never blue. Calyx superior or ½-superior, limb 4-5-many-fid or -partite, persistent or deciduous,

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valvate or imbricate, sometimes entire or closed in bud. Petals inserted on a disk surrounding the cavity of the calvx, equal in number to the calyx-lobes and alternate with them, rarely 0. Disc lining the calyxtube, staminiferous at the margin. Stamens usually numerous, inserted with the petals in several rows, rarely definite and alternate with the petals; filaments free or more or less coherent at the base or in bundles opposite the petals; anthers small roundish, with parallel cells bursting longitudinally. Ovary inferior or \frac{1}{2}-inferior, crowned by a fleshy disk, 1celled with 1 or more ovules, or more usually 2-many-celled with many ovules; placentation axile (parietal in Rhodamnia); style terminal rarely lateral, smooth or bearded at the summit; stigma undivided. Fruit usually crowned by the calyx-limb, either 1-celled and 1-seeded by abortion, or 2-many-celled with loculicidal dehiscence; or baccate and indehiscent with the cells many-seeded or 1-seeded by arrest. Seeds angular cylindric or compressed; testa hard or membranous, sometimes winged; albumen 0; embryo straight curved or spirally twisted, cotyledons usually short and obtuse sometimes combined into a mass with the radicle, very rarely leafy, radicle often thick. DISTRIB.—Tropical and sub-tropical regions of both hemispheres; species upwards of 2800.

#### TRIBE I. Leptospermex. Fruit capsular; leaves opposite or alternate.

Leaves narrow.

Flowers few or solitary in the leaf-axils.

Stamens 10 or fewer, free, in a single series; leaves

Stamens numerous, free, in a single series; leaves alter-

Flowers in heads or spikes; leaves usually alternate; stamens numerous, slightly combined into bundles opposite to and longer than the petals

Leaves broad.

Flowers in axillary cymes; leaves alternate; stamens indefinite, united into 5 bundles opposite to and shorter than the petals

TRIBE II. Myrtex. Fruit a berry; leaves opposite, often gland-dotted.

Ovary 1-celled with 2 parietal multi-ovulate placentas: flowers small; leaves 3-nerved from the base

Ovary 1-3-celled with 2 rows of ovules in each cell separated by spurious partitions; flowers rather large; leaves 3- to 5-nerved at the base, seeds numerous ... Ovary 5- (sometimes 4-) celled, with several ovules in each

cell, often with spurious partitions; seeds few; embryo long and narrow with small cotyledons: flowers small and numerous; leaves not 3-nerved

BÆCKEA.

LEPTOSPERMUM.

MELALEUCA,

TRISTANIA.

RHODAMNIA.

6. RHODOMYRTUS.

... 7. DECASPERMUM.

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Ovary 2.3-celled with several ovules in each cell, without spurious partitions; embryo thick, fleshy; cotyledons		
large radicle short; seeds few; stamens numerous	8.	EUGENIA.
Ovary 2-celled with numerous ovules in each cell; flowers		
small, few, in small axillary inflorescences. Stamens 8:		
otherwise as in Eugenia	9.	PSEUDO-EUGENIA
TRIRE III. Lecythideæ. Fruit hard and fibrous or fleshy,		
indehiscent; leaves alternate, not gland-dotted.		
Stamens all antheriferous, staminodes none; embryo un-		
divided; fruit angular, one-seeded	10.	BARRINGTONIA.
Inner stamens shorter and without anthers; embryo in-		
volute; the cotyledons leafy, plicate: fruit ovoid, several-		
	11.	PLANCHONIA.

#### 1. BECKEA, Linn.

Glabrous heath-like shrubs. Leaves opposite, narrow, pointed, entire, with many pellucid glands. Flowers 5-merous, rarely 4-merous, axillary, peduncled, with 2 minutely bracteolate. Calyx-tube widely campanulate; lobes 5, membranous, persistent. Petals 5, suborbicular. Stamens 10 or fewer, shorter than the petals. Ovary in the single Malay species ½-inferior, 2-3-celled, with several ovules in each cell. Capsule bursting from above loculicidally. Seeds angular; embryo straight with short cotyledons.—Distrib. Species about 50, the greater number Australian, a few in New Caledonia, one only extending into India.

There are considerable differences in the stamens amongst the species referred by Messrs. Bentham and Hooker to this Linnæan genus. Some of the species have only 5 stamens, while others (like the solitary Indo-Malayan one) have 10 which however are not unfrequently reduced to 8. There are moreover differences in the shape of the anthers and filaments. The ovaries also in some have two and in others three cells. On these and other characters more than a dozen genera were founded by Schauer and others, but these have been advantageously reduced to Bæckea.

Becker frutescens, Linn, Sp. Pl. 358. A slender shrub with thin wiry branches. Leaves linear, pointed, '25 to '5 in. long and '05 in. broad. Flowers axillary, '08 in. in diam., usually solitary, in short peduncles. Calyx with 5 rounded persistent lobes. Stamens 10 (or sometimes only 8). Ovary half-inferior. DC. Prod. III, 229: Sur. in Trans. Linn, Soc. III, 260; Bot. Mag. t. 2802; Blume Mus. Bot. I, 69; Miq. Fl. Ind. Bat. Vol. I. Pt. 1, 406; Suppl. 308; Benth. Fl. Hong-Kong, 118: Duthie in Hook. fil. Fl. Br. Ind. II, 463. B. Cumingiana, Schauer in Walp. Rep. II, 920. B. chinensis, Gærtn. Fruct. I, 157, t. 31. B. sumatrana, Bl. Mus. Bot. I, 69.

In all the provinces except the Andaman and Nicobar Islands. DISTRIB.—Malayan Archipelago.

#### 2. LEPTOSPERMUM. Forst.

Shrubs or small trees, glabrous or silky-pubescent. Leaves alternate, entire, rigid, with 1-3 nerves or nerveless. Flowers solitary and axillary, or 2-3 together at the ends of the branches, rarely peduncled, sometimes polygamous; bracts broad, scarious, often imbricate, the lower ones caducous. Calyx-tube broadly campanulate or turbinate, adnate to the ovary below, the free upper part broad; lobes 5. Petals 5, spreading. Stamens numerous, in a single series, not longer than the petals; anthers versatile, their parallel cells bursting longitudinally. Ovary inferior or ½-inferior, enclosed in the calyx-tube, 5- or more-celled, rarely 3- or 4-celled; style filiform, inserted in a deep depression of the ovary, sometimes short; stigma capitate or peltate. Capsule usually exceeding the calyx-tube, opening loculicidally from above. Seeds numerous, linear or winged, often sterile; embryo straight. Distrib.—Species upwards of 30, chiefly Australian, a few in New Zealand and New Caledonia.

#### NOTE.

As in Bæckea the species have been separated off into several genera which have been reduced by Messrs. Bentham and Hooker.

Leptospermum flavescens, Sm. in Trans. Linn. Soc. III, 262. A bush or small scraggy tree with thin, striate, 4-angled branches: the young parts glabrous or sericeous. Leaves coriaceous, narrowly oblong-lanceolate to oblanceolate, obtuse, often with a deciduous point, subsessile; when dry distinctly dotted beneath and obscurely 3-nerved, glabrous or silky on the midrib beneath and on the edges, from '4 to 1 in long and '1 to '3 in. broad. Flowers sessile or sub-sessile, about '5 or '6 in in diam. (when dry). Calyx-tube glabrous or sericeous. Capsule much depressed, surrounded by the calyx-tube, glabrous or hairy, 5-ridged, pitted, opening by 5 valves, '25 to '30 in. in diam. (when dry). DC. Prod. III, 227; Hook. fil. Fl. Tasm. I, 139; Benth. Fl. Austral. III, 104.

This species is common and widely distributed in Australia and has several well-marked varieties of which two occur in our region,

var. commune, Benth. Fl. Austral. III, 104. Young branches leaves and calyx-tube glabrous or glabrescent. Leaves narrowly oblong or linear-lanceolate, '1 to '15 in. broad. L. flavescens, Bot. Mag. t. 2695. L. amboinensis, Blume Bijdr. 1100: Mus. Bot. Lugd. Bat. I, 68; DC. Prod. III, 229: Miq. Fl. Ind. Bat. I, Pt. 1, 404; Duthie in Hook. fil. Fl. Br. Ind. II, 464. L. polygalifolium, Salisb. Prod. 350; L. Thea, Willd. Spec. Pl. II, 949. L. porophyllum, Cav. Ic. IV, 17, t. 330, fig. 2. Macklottia amboinensis, Korth. in Ned. Kruidk. Arch. I, 196. Myrtus amboinensis, Rumph. Herb. Amb. II, 77, t. 18.

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Malacca (on Mount Ophir); Griffith (K.D. 2339); Lobb, Stolickza, Maingay (K.D.) 713. Керан, Ridley 5349. Distrib.—Bangka, Amboina, Moluccas, Borneo, Australia.

var. javanica. Young branches densely sericeous; calyx-tube glabrescent, occasionally very sericeous. Leaves obovate-lanceolate, broadly obtuse, with long silky hairs on the margins and on the midrib beneath. Flowers often crowded. L. javanicum, Blume Bijdr. 1100; Mus. Bot. Lugd. Bat. I, 68; DC. Prod. III, 229: Duthie in Hook. fil. Fl. Br. Ind. II, 464. L. floribundum, Jungh. Java I, 578; Nat. en Geneesk. Arch. Ned. Ind. II, 370; Miq. Fl. Ind. Bat. I, Pt. 1, 404. Macklottia javanica, Korth. Ned. Kruidk. Arch. 196.

MALACCA: Griffith. PERAK: Wray 330, 885, 3839: Scortechini 754: King's Collector 7426, 7435. DISTRIB.—Sumatra, Java, Celebes, Borneo. Burmah (a single specimen) at Moulmein; Lobb. This variety is much commoner in the Peninsula than the former.

#### 3. MELALEUCA, Linn.

Trees or shrubs. Leaves alternate, rarely opposite, entire, lanceolate or linear, flat or subterete, 1-3-many-nerved. Flowers in heads or
spikes, each sessile in the axil of a floral leaf, 5-merous; bracts deciduous. Calyx-tube subglobose; lobes 5, imbricate or open, deciduous or
persistent. Petals 5, spreading, deciduous. Stamens numerous, more
or less united at their bases into 5 bundles opposite the petals; anthers
versatile, the cells parallel and bursting longitudinally. Ovary inferior
or half-inferior, enclosed in the tube of the calyx; style filiform, stigma
small; ovules numerous. Capsule included in the calyx, dehiscing
loculicidally by 3 valves. Perfect seeds cuneate: embryo straight,
longer than the radicle. Distrib.—Species about 130, almost all Australian, but one scattered in Asia.

MELALEUCA LEUCADENDRON, Linn. Mant. 105. A tree often of considerable size; the bark pale, thick, peeling off in papery layers. Branches usually pendulous, slender. Leaves coriaceous, alternate, narrowly oblong-elliptic, oblique or falcate, acuminate acute or obtuse, narrowed below into a short petiole, with 3 to 5 or 7 vertical unastomosing nerves; when young adpressed-hairy, when old glabrous: length 1.5 to 5 in.; breadth .2 to 1 in. Spikes 2 to 6 in. long; sometimes interrupted, solitary, at first terminal but subsequently surmounted by a leaf-axis, the rachis and calices glabrous or hairy: calyx-tube ovoid, the lobes orbicular. Petals .1 to .15 in. in diam. Staminal bundles under .5 in. long. Fruit about 2 in. in diam. Benth. Fl. Austral. III, 142: Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 61; Fl. Br. Burm. I, 472; Duthie in Hook. fil. Fl. Br. Ind. II, 465.

MALACCA: Singapore. DISTRIB.—Malayan Archipelago, British India, Australia.

The following two varieties have been distinguished by Mr. Duthie in Hooker's Flora of British India.

var. Leucadendron; spikes glabrous. Linn. Mant. 105 and Suppl. 342; Lour. Fl. Cochinch. 468; Roxb. Fl. Ind. III, 397; DC. Prodr. III, 212; Wall. Cat. 3646; Blume Mus. Bot. I, 66; Miq. Fl. Ind. Bat. I, pt. 1, 401. Myrtus Leucadendron, Linn.—Rumph. Herb. Amb. II, 72, tt. 16, 17, f. 1,—Cultivated in India.

VAR. minor; spikes villous. M. minor, Sm. in Rees. Cycl. 23; DC. Prodr. III, 212; Wall. Cat. 3645; Blume Mus. Bot. I, 67; Miq. Fl. Ind. Bat. I, Pt. 1, 403. M. Cajuputi, Roxb. Fl. Ind. III, 394; W. & A. Prodr. 326; Miq. l.c. 403. M. Leucadendron, Lam. Encycl. 641. M. viridiflora, Gertn. Fruct. I, 173, t. 35; DC. Prodr. l.c.; Wall. Cat. 3647. M. saligna, Blume Mus. Bot. I, 66. M. Cumingiana and lancifolia, Turcz. in Bull. Soc. Mosc. xx. 164. M. saligna, Gmel. Syst. 793.—Rumph. Herb. Amb. II, 76.—This appears to be the plant from which the Cajuputoil of commerce is chiefly obtained.

#### 4. Tristania, R. Br.

Tall shrubs or trees. Leaves alternate or crowded at the summit of the branches, rarely opposite, coriaceous, glabrous. Flowers small, yellow or white, in pedunculate axillary cymes; bracts deciduous or 0. Calyx-tube turbinate-campanulate or open, attached below to the ovary; lobes 5, short, persistent. Petals 5, imbricate, spreading. Stamens numerous, shorter than the petals, usually united in 5 bundles and opposite to them; anthers versatile, cells parallel and opening longitudinally. Ovary inferior or ½-superior, the apex flat or convex; 3-celled; ovules many in each cell, suspended or horizontal. Capsule loculicidally 3-valved. Perfect seeds few, linear, cuneate, or winged at the upper part; embryo straight, cotyledons broad, longer than the radicle. Distrib.—About 22 species inhabiting the Malay peninsula and islands, New Caledonia, and Australia.

Leaves sessile, sub-auriculate ... ... ... 1. T. subauriculata.

Leaves narrowed into a short petiole.

Cymes (with their peduncles) much shorter than the leaves.

Leaves oblanceolate or obovate-oblong; capsules globular.

Petals transversely oblong, entire, shortly clawed;
capsules '4 to '5 in. in diam. ... ... ... ... ... 2. T. merguensis.

Petals sub-rotund, subentire, hairy; capsules '35 in. in
diam. ... ... ... ... ... ... ... 3. T. Maingayi.

Leaves obovate; capsule oblong, '2 in. long; petals subrotund, their margins serrate ... ... ... 4. T. obovata.

Cymes (with their peduncles) longer than the leaves ... 5. T. Whiteana.

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1. Tristania subauriculata, n. sp. King. A tree 10 to 40 feet high: the young branches pale (when dry) puberulous or glabrescent. Leaves very coriaceous, sessile, obovate-oblong, the apex broad, blunt, emarginate or slightly pointed, gradually narrowed to the slightly-auricled base: both surfaces glabrous, pale when dry, the upper shining, the lower paler, dull, obscurely glandular: main-nerves spreading, not prominent, 2 in. apart, length 2.5 to 6 in.; breadth 1.5 to 2.5 in. Cymes axillary, few-flowered, much shorter than the leaves, dichotomous: the peduncles 3 to 8 in. long, compressed, clothed, especially above, with white silky hairs. Flowers 25 in. across. Calyx-tube tubular-campanulate, densely pubescent below externally, the teeth broadly triangular, blunt, short. Petals rounded, entire, glabrous. Stamens in 5 groups of 10 each. Ovary depressed-globular, glabrous. Capsule subglobular, glabrous, half-enveloped by the calyx, 25 in. in diam. Seeds compressed, about 8 in each cell.

PERAK: King's Collector 7047, 8253.

This is allied to T. merguensis, but has broader leaves of much thicker texture and sessile; shorter fewer-flowered cymes, and smaller flowers and fruit.

2. Tristania merguensis, Griff. in Journ. As. Soc. Beng. for 1854. p. 637. A tree. Young branches stout with pale bark when dry; the youngest puberulous. Leaves obovate-lanceolate, obtuse or obtusely acuminate, narrowed to the very short or almost obsolete petiole; mainnerves ascending, distinct, '1 in. apart; both surfaces glabrous, the lower dull, paler and obscurely glandular, the upper shining; length 3.5 to 7 in.; breadth 1.15 to 2 in.; petiole 1 to 2 in. Cymes on angular peduncles 5 to 1.5 in. long, slightly supra-axillary, shorter than the leaves, dichotomous, hoary-pubescent, especially towards the apex. Flowers densely crowded at the ends of the branchlets, 25 in. in diam. Calyx-tube densely clothed with white pubescence on both surfaces, broadly cupular, tapered to the very short almost obsolete pedicel, the teeth broad, rounded. Petals small, transversely oblong, shortly clawed. Ovary pilose. Capsule sub-globular, large ('4 in. in diam.), glabrous, half-enveloped by the calyx; its valves broad, blunt. Seeds compressed, about 8 in each cell. Kurz, For. Fl. Burm. I, 473. "Tristaniæ affinis." Griff. Notul. 650: Ic. Pl. Asiat. t. 636, f. 3. Melaleuca eugeniifolia, Wall. Cat. 3648. M. decurrens, Wall. Cat. 3649.

MALACCA: Finlayson, Harvey. PERAK: Wray 2921, 4124; Scortechini 1021. Pahang: Ridley 1062: growing at elevations of several thousand feet. DISTRIB.—Burma, Borneo.

3. TRISTANIA MAINGANI, Duthie in Hook. fil. Fl. Br. Ind. II, 467. A tree: young branches with brown bark (when dry) and covered with deciduous white hairs. Leaves narrowly oblong-oblanceolate acute, much

narrowed to the short petiole; main-nerves spreading, less than 'l inapart, not conspicuous; lower surface dull and glandular, slightly paler than the snining upper: length 1.75 to 3.5 in.; breadth 5 to 1.25 in.; petiole 'l to 'l in. Cymes on angular peduncles 5 to 1.25 in. long, axillary, shorter than the leaves, dichotomous, hoary; the flowers few, crowded, 'l in. in diam., on very short pedicels. Calyx-tube broadly cup-snaped, tapered to the base; the teeth shallow, broad, sub-acute. Petats small, sub-rotund, sub-entire, hairy outside. Ovary pubescent. Capsule large ('35 in. in diam.) sub-globular, glabrous, enclosed in the calyx except at the apex; its valves broad, blunt. Seeds winged, 9 or 10 in each cell.

Penang: Maingay (K.D. 769); Curtis, 238, 438.

I keep up this species with much hesitation. It appears to me to be a form of *T. merguensis* with leaves and capsules smaller than usual.

4. Tristania obovata, R. Br. in Benn. and Horsf. Fl. Jav. 127, t. 27. A large snrub: the young branches reddish-brown, rusty puberulous. Leaves obovate, much contracted to the short petiole, the apex rounded or retuse; both surfaces glabrous, the lower glandular and pater: main-nerves spreading, about 'I in apart; length 1.5 to 2.5 in.; breadth '6 to 1.2 in.; petiole '2 to '4 in. Cymes extra-axillary and terminal, few-flowered, puberulous or glabrous, much shorter than the leaves. Flowers '15 in. long, on pedicels shorter than themselves, often in pairs. Calyx-tube turbinate; the teeth rounded, short. Petals subrotund with serrate margins. Ovary silky. Capsule '2 in. long, oval, glabrous, much longer than the persistent calyx: its valves broad, blunt. Miq. Fl. 1nd. Bat. I, Pt. 1, 397.

SINGAPORE: Ridley 5886.

5. Tristania Whiteana, Griff. Pl. Cantor. 18. A shrub, the young bark brown. Leaves oblanceolate, bluntly acuminate, much narrowed to the snort petiole; both surfaces shining, the lower pellucid-punctate, pale: main-nerves numerous (about '05 in. apart), sub-horizontal; length 3 to 5.5 in.; breadth '75 to 1.75 in.; petiole '25 to '5 in. Cymes on peduncles nearly as long as the leaves, corymbosely paniculate, minutely pubescent, axillary and terminal, the bracts few and leaflike; bracteoies small caducous. Flowers numerous, on pedicels shorter than themselves, '1 in. across. Calyx-tube obconic, densely pubescent on both surfaces, its teeth obsolete. Petals orbicular, glandular. Capsule under '1 in. in diam., free from the calyx except at the base. T. Wightiana, Duthie in Hook. fil. Fl. Br. Ind. II, 466. T. sumatrana, Miq. Fl. Ind. Bat. Suppl. 308. Hypericinea pimentifolia, Wall. Cat. 4828.

MALACCA: Griffith (K.D. 2340). SINGAPORE: Wallich, Lobb. PENANG: Walker 62. DISTRIB.—Sumatra, Java, Borneo.

#### NOTE.

In Hooker's Flora of British India T. burmannica, Griff. is said to have been collected at Malacca. I find however no specimens from that locality in either the Kew or the Calcutta Herbarium; and I therefore omit it here.

#### RHODAMNIA, Jack.

Shrubs or small trees. Leaves opposite, 3-nerved, hoary or pubescent beneath. Flowers rather small, pedicels short, sometimes shortly fasciculate or in short lax racemes; bracteoles small, deciduous. Calyxtube ovoid or subglobose, not produced beyond the ovary; segments 4, persistent. Petals 4, spreading. Stamens numerous, in several series, free; filiments filiform; anthers versatile with parallel cells dehiscing longitudinally. Overy 1-celled with parietal placentas and many ovules; style filiform, stigma peltate. Berry globose, crowned with the limb of the calyx. Seeds few, reniform, globose or variously compressed, testa hard; embryo horseshoe-shaped, radicle long, cotyledous very short. DISTRIB.—About 6 species; Australia, and Tropical Asia.

RHODAMNIA TRINERVIA, Blume Mus. Bot. Lugd. Bat. I, 79. small tree or a shrub: young parts and inflorescence often silky. Leaves ovate-oblong or oblong-lanceolate, acuminate, 3-nerved; upper surface glabrous, reticulate; the lower glabrous or silvery pubescent; length 1.75 to 4.5 in.; breadth .75 to 2 in.; petiole .2 to .35 in. Peduncles varying in length but always much shorter than the leaves. axillary, 1- rarely 3-flowered, minutely bracteolate near the calyx. Fruit globose, reddish, 2 to 3 in. in diam. Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 63; For. Fl. Br. Burma I, 474; Benth. Fl. Austral. III, 278; Duthie in Hook. fil. Fl. Br. Ind. II, 468. Myrtus trinervia, Sm. in Trans. Linn. Soc. III, 280. Eugenia? trinervia, DC. Prod. III. 279: Bot. Mag. 3223.

In all the Provinces except the Andaman Islands; common. DISTRIB. -The Malayan Archipelago and Philippines to Australia, Burma.

VAR. concolor; leaves green on both surfaces, sparingly pubescent, peduncles 4-7- or fewer-flowered. R. cinerea, Griff. Notul. 653, not of Jack ; Kurz in Journ. As. Soc. l.c. R. concolor, Miq. Fl. Ind. Bat. Suppl. I, 315. Myrtus smilacifolia, Wall. Cat. 3629.

VAR. spectabilis; leaves silvery-white beneath or greyish when old. flowers usually fewer, 2 or solitary. R. spectabilis, Blume Mus. Bot. I. 78; Miq. Fl. Ind. Bat. I, Pt. 1, 479; Kurz l.c. R. cinerea, Jack. in Mal. Misc. Monoxora spectabilis, Wight Ill. II, 12, t. 97, f. 5, R. Nageli, Miq. Fl. Ind. Bat. I, Pt. 1, 478. R. superiflora and R. Mulleri, Bl. Lc. 79.

This species, being widely distributed, presents many forms several of which have been described as species. The above arrangement of these forms into two varieties was first suggested by Kurz.

#### 6. RHODOMYRTUS, DC.

Small trees or tomentose shrubs. Leaves opposite, 3-nerved. Flowers rather large, axillary. Calyx-tube turbinate, oblong or subglobose, slightly produced above the ovary; lobes 5, rarely 4, herbaceous, persistent. Petals 5, rarely 4, spreading. Stamens indefinite, free, in many series. Ovary 1-2-3-celled with spurious partitions, or divided into numerous 1-ovuled superposed cells; style filiform, stigma capitate. Berry globose or ovoid, with few or numerous seeds not distinctly superposed in rows. Seeds compressed, reniform or nearly orbicular, horizontal, testa hard; embryo curved or spiral, radicle very long, cotyledons small. Distrib.—5 species, four of them inhabitants of E. Australia, and one widely distributed over Tropical Asia, especially throughout the Indian Archipelago, as far as China.

RHODOMYRTUS TOMENTOSA, Wight Spicil. Neilgh. I, 60, t. 71. A shrub 4 to 8 feet high: young parts tomentose. Leaves the lower ternate, the upper opposite, elliptic to obovate, obtuse, sometimes mucronate, 3-nerved, the under surface covered with soft white tomentum, the upper glabrous: length 1.5 to 2.5 in.; breadth .65 to 1 in.; petiole 1 to 15 in. Peduncles axillary shorter than the leaves, 1-3flowered, bracteolate close to the calyx. Flowers 5 to 75 in across. Calyx tomentose, with 5 unequal lobes. Petals downy, shortly clawed. Berry about the size of a cherry, oval or sub-globose, dark-purple: pulp abundant, sweet. Seeds compressed, forming 2 rows in each cell. Miq. Fl. Ind. Bat. I, Pt 1, 477; Benth. Fl. Hongk. 121; Duthie in Hook. fil. Fl. Br. Ind. II, 469; Trimen Fl. Ceylon. II, 166. Myrtus tomentosa, Ait.; DC. Prodr. III, 240; Vahl Symb. II, 56; Blume Bijdr. 1081; W. & A. Prodr. I, 328; Wight III, II, 12, t. 97, f. 3, Ic. 522; Roxb. Fl. Ind. II, 498; Wall. Cat. 3630; Korth. in Ned. Kruidk. Arch. I, 197. M. canescens, Lour. Fl. Cochine, I, 311.

Penang, Malacca, Perak. Distrib.—Malayan Archipelago. Hills of Southern British India and Ceylon.

### 7. DECASPERMUM, Forst.

Shrubs or small trees. Leaves opposite, pinnate-nerved. Flowers small, in axillary racemes, or in terminal leafy panicles, occasionally polygamous. Calyx-tube campanulate, slightly or not at all produced

above the ovary; lobes 4 or 5, spreading. Petals 4 or 5, spreading. Stamens numerous in several series, free, filaments filiform; anthers small, versatile, with parallel cells opening longitudinally. Ovary 4- or 5-celled with 2 or very few ovules in each cell; cells often divided by spurious dissepiments; style filiform, stigma peltate. Berry glooose, crowned by the calyx-lobes. Seeds 8 to 10, reniform-sub-globose, testa hard; embryo horse-shoe-shaped or circular, with long radicle and snort cobyledons. Distrib -About 4 species in tropical Asia, Australia, and

DECASPERMUM PANICULATUM, Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 61: For. Flora. Br. Burma I, 475. A small tree, often 30 feet Young parts and inflorescence minutely sericeous-tomentose. Leaves membranous or thinly coriaceous, oblong-lanceolate or ovatelanceolate, acuminate, the base often narrowed, edges entire; mainnerves about 10 pairs, spreading, not prominent; upper surface glabrous: the lower paler and reddish, glandular, midrib always pubescent on the lower and always on the upper; length 1.25 to 3.5 in.; breadth 4 to 1 in.; petiole 1 to 3 in. Panicles axillary and shorter than the leaves, or terminal and longer than the leaves; bracts small and deciduous, or leaf-like and permanent. Flowers 2 to 3 in. in diam., often polygamous. Petals white, pubescent inside. Calyx-tube more or less clothed with white hairs; the lobes roundish or sub-acute, hairy or glabrous. Style exserted. Berry globose, about 1 in. in diam. Duthie in Hook. fil. Fl. Br. Ind. I, 470. Nelitris paniculata, Lindl. Collect. Bot. under 16; DC. Prod. III, 231; Wall. Cat. 3627; Wight Ill. II, t. 97, fig. 10. Icon. 521; Benth. Fl. Austral. III, 279. N. polyguma, Spreng. Syst. II, 488; Korth. in Ned. Kruidk. Arch. I, 197. N. pallescens, Miq. Fl. Ind. Bat. Suppl. 314. Eugenia polygama, Roxb. Hort. Beng. 92; Fl. Br. Ind. II, 491. E. cuspidata, Wall. Cat. 3627. Memecylon acuminatum, Wall. Cat. 4105; Syzygium vimineum, Wall. Cat. 3593 B. Hiræa Finlaysoniana, Wall. Cat. 3566 F.

In all the provinces except the Andaman and Nicobar Islands common. Distrib.—Malayan Archipelago, Burma, Khasia Hills, Sikkis:

Various other forms to which specific names have been given appear to me be reducible here. The Wallichian examples in Herb. Calcutta of Wall. Cat. 359 to B and 4105 belong in my opinion to this species.

38

38 10

VAR. Finlaysoniana, Duthie l.c.; leaves sub-coriaceous, paniele shorter than the leaves, few-flowered, calyx densely tomentose, its lobe rounded: stamens nearly equalling the petals. N. polymorpha, Blun Mus. Bot. Lugd. Bat. I, 75, t. LX. Hirea Finlaysoniana, Wall. Ca

#### 8. EUGENIA, Linn.

Trees or shrubs, smooth or rarely tomentose or setose. opposite rarely alternate, coriaceous or membranous, pinnate-nerved. Inflorescence centripetal with solitary axillary flowers, or in short racemes or centrifugal in dense terminal or axillary cymes or in terminal or lateral trichotomous panicles. Bracts usually small and deciduous. Calyx-tube globose or more or less elongate, 4- or 5-lobed or sub-truncate. Petals 4 or 5, free and spreading or connivent calyptrate and caducous. Disc lining the calyx-tube, staminiferous at the edge. Stamens numerous, in many rows, usually combined in 4 or 5 bundles; filaments slender; anthers small, versatile, dehiscing longitudinally. inferior, 2- rarely 3-celled; ovules many in each cell; style filiform, stigma small. Fruit inferior, crowned by the remains of the calvx. pulpy, rarely dry. Seeds few, oblong or globose, often compressed, testa membranous or cartilaginous, albumen none or very scanty; embryo thick, fleshy. DISTRIB.—About 650 species chiefly in tropical America and Asia; a few in tropical Africa and Australia.

Sect. I. Jambosa. Flowers usually 4-merous, often large. Calya clavate, funnel-shaped or sub-globose, its staminal disc often thickened and its mouth with 4-persistent often thickened lobes crowning the fruit. Petals free, Berry pulpy; seeds large.

#### Leaves large-

Leaves with their main nerves under 20 pairs, bold, the reticulations inconspicuous, mostly from 8 to 14 in. long (except in Nos. 8, 9 and 10)—

Flowers 1 inch or more across-

Leaves glabrous-

Young branches sub-terete or compressed ... {
7. E. papillosa.
8. E. densiflora.
9. E. plumbea.
Young branches 4-angled ... ... 10. E. Scortechinii.
Leaves hairy beneath; flowers in terminal panicles 11. E. mollis.
8 8 to 16 in. long, with very numerous (more than

Leaves 8 to 16 in. long, with very numerous (more than 20 pairs) of bold distinct sub-horizontal main nerves; flowers half an inch or more in diameter—

Reticulations of leaves distinct ... ... ... {12. E. quadrata.} 13. E. scalarinervis. 14. E. pergamentacea.

	Reticulations of leaves faint	••.	•••	\ 15.	E.	Dyeriana, Hemsleyana,
T	icaves small—			\ 10.	11.	mate gana,
2	Leaves 2.5 to 8 in. long (longer in No Flowers in terminal spreading panic					
	Leaves obovate, oblanceolate, or b		elliptic	118.	E.	pachyphylla. lepidocarpa. garcinifolia.
				20.	E.	crenulata. grandis.
	Leaves oblong, ovate or elliptic	, tape	ring sligi	$\text{htly}$ $\left\{egin{array}{l} 22. \\ 23. \end{array}\right.$	E.	Thumra. Griffithii.
	TO COURT ONLY			24.	E.	Clarkeana.
	Leaves ovate-lanceolate or narrow times broadly elliptic in E. purifoli	ia) muc	ch narro	wed		
	to each end, the apices sometimes	caudat	e-acumir		77	7
				27.	E.	pendens. Burkilliana. Helferi.
	Til man had allamata					Kurzii, VAR.
	Flower-buds clavate	•••	9			anisosepala. Gageana.
	•			33.	E.	Hullettiana. chlorantha.
				(35.	E.	penangian <b>a.</b> Ridleyi.
	Flower-buds globular, not clava	ite		… ∫ 37.	E.	. pyrifolia. lineata.
	Flowers in small axillary or termina racemose few-flowered panicles —	l racer	nes or in	•	Ľi.	cymosa.
	racemose rew-nowered princies —			C39	T	conglomerata.
				40.	E.	urceolata. glauca.
	Flower buds globular or slightly	elongat	ed	42	E.	subrufa. Duthicana.
				45.	E	polyantha. Manii.
	Dlower hade and dame.		1			caudata. filiformis.
	Flower-buds and flowers much ele-			··· € 48.	E.	andamanica.
	or cymes-			run		
	Flower-buds globular 508	)late	***	49.	E	. Hoseana.

Materials for a Flora of the Malayan Peninsula.

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50. E. Benjamina.
                                                               51. E. variolosa.
                                                               52. E. claviflora.
          Flower-buds much elongated
                                                              53. E. zeylanica.
                                                              54. E. grata.
                                                              55. E. tecta.
        Flowers in conspicuously bracteolate dense clusters, (56. E. pseudo-tetra-
                                                                                ptera.
        branches 4-angled
    Sect. II. SYZYGIUM. Flowers 4- or 5-merous, usually small: the calyx obovoid,
turbinate or clavate, its staminal disc rarely thickened, the mouth 4- or 5-toothed
or lobed or sub-entire. Petals more or less connate, much imbricate and calyptrately
deciduous. Berries small, sub-globose or oblong, often with little pulp.
  Flowers panicled, their buds 2 in. or more in length (less
  in E. nigricans and E. expansa), clavate, always narrowed
   into a long pseudo-stalk-
     Leaves more than 2 inches long-
       Main-nerves of leaves under 25 pairs, distinct—
                                                                 58. E. valdevenosa.
                                                                59. E. oblongifolia.
          Panicles large, lax, spreading, mostly terminal
                                                                60. E. sub-hori-
                                                                              zontalis.
                                                                61. E. Valetoniana.
                                                                62. E. expansa.
          Panicles short, both axillary and terminal ...
                                                                 63. E. chloreleuca.
                                                                  64. E. nigricans.
                                                                  65. E. inophylla.
                                                                  66. E. oblata.
        Nerves of leaves very numerous, close together and 67. E. Bernardi.
                                                                  68. E. Prainiana.
         equally distinct or often all obscure ...
                                                                  69. E. Pearsoniana.
                                                                   70. E. lævicaulis.
                                                                  71. E. Goodenovii.
       Leaves 2 inches or less in length, rarely as much as 2.5 in.—
         Glabrous-
                                                               ... 72. E. linocieroidea.
           Fruit oblong
                                                                  73. E. myrtifolia.
                                                                  74. E. Stapfiana.
75. E. Wrayi.
            Fruit globose or sub-globose ...
                                                                   76. E. setosa.
          Setose
     Flowers numerous, less than '2 in. long, in terminal or
     axillary panicles; oblong or clavate, tapered gradually to
      the base, rarely narrowed into a short pseudo-stalk, all
      without a true pedicel except sometimes the terminal ones
      of the branchlets.
                                                                ... 77. E. inasensis.
78. E. subdecussata.
79. E. punctulata.
        Leaves obtuse or sub-acute ...
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					[ 80. E. bracteolata.
					81. E. venulosa.
T		•••			82. E. pseudo-subtilis.
Leaves obtuse or sub-acute			***	•••	83. E. microcalyx.
					84. E. scoparia.
					85. E. myriantha.
					(86. E. verecunda.
					87. E. pseudo-subtilis
					VAR. sub-acuminata.
				•	88.E. Swettenhamiana.
7					89. E. acuminatissima.
Leaves more or less acuminate	***	•••	*** ,	•••	90. E. Kunstleri.
					91. E. pustulata.
					92. E. Koordersiana.
					93. E. simulans.
					94. E. Curtisii.

L buds

Flowers small, numerous, in short much-branched spreading cymose vanicles mostly from the scars of fallen leaves; 
96. E. nicobarica.
globular or nearly so, narrowed gradually to the base or 
97. E. Jambolana.
abruptly contracted into a short pseudo-stalk.

1. Eugenia formosa, Wall. Pl. As. Rap. II. 6, t. 108: Wall. Cat. (in part) 3609. A tree, 20 to 30 feet high: young branches almost terete, with pale bark. Leaves corraceous, ovate-oblong to lanceolate-oblong, much tapered to the acute apex, sometimes in threes; the base rounded, slightly cordate; upper surface pale, olivaceous (when dry), the lower paler; both quite smooth; main-nerves 12 to 20 pairs, rather strong, ascending, rather straight, interarching 2 to 3 in. from the edge; length 8 to 12 occasionally to 18 in.; breadth 3 to 5 in.; petiole about 2 in. Flowers about 2 in. across (excluding the stamens), pale rose-coloured, on pedicels 3 to 5 in long, bracteolate near the apex, in fascicles of three (occasionally solitary), usually from the branches below the leaves but sometimes terminal. Calyx-tube ·6 to ·75 in. long, clavateturbinate, smooth; the 4 lobes broad, rounded, unequal, 5 in. broad and about half as long. Petals 5 in. long, almost orbicular. Filaments more than I in. long, very numerous, spreading. Fruit as large as a small apple, globose, contracted towards the base, crowned at the apex by the spreading calyx-lobes, white, smooth, 2-seeded, the pulp rather scanty. Dutnie in Hook. fil. Fl. Br. Ind. II, 471; Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 68; For. Fl. Brit. Burm. I, 492; Wight III. II, 14. sambosa formosa, Walp. Rep. Bot. II, 191; Blume Mus. Bot. I, 92; Miq. Hl. Ind. Bat. I, Pt. 1, 412. J. mappacea, Korth. in Ned. Kruidk. Arch. 1, 200. E. somarangensis, DC. Prod. III, 286.

PERAK: King's Collector 6254; Scortechini.

Only a few specimens of this are to be found from our area in the Herbaria at Kew and Calcutta, and they have all oblong-lanceolate leaves. In British India the form with ovate-oblong leaves is the commoner.

2. Eugenia perakensis, King n. sp. A glabrous tree, 50 to 70 feet high: young branches as thick as a swan-quill, brown when dry. Leaves coriaceous, oblong-elliptic, the apex sub-acute, narrowed gradually to the cordate, slightly oblique base; upper surface olivaceous when dry, the lower pale-brown; main-nerves 12 to 14 pairs, ascending, curving a little and interarching '2 to '4 in. from the edge, very prominent on the lower surface, faint on the upper; intermediate nerves and reticulations slender but distinct; length 12 to 18 in.; breadth 5 to 8 in.; petiole 3 in. very stout. Flowers 1 in. or more across, in fascicles of 6 to 8 from depressed tubercles on the smaller branches, on peduncles '5 in. long. Calyx-tube campanulate, '5 in. long, contracted into a pseudo-stalk at its junction with the peduncle: the mouth with 4 broad, rounded lobes less than 1 in. long. Petals orbicular, longer than the calyx-lobes. Fruit unknown.

PERAK: King's Collector 5595.

A species only once collected and the specimens have no fruit; somewhat resembling E. macrocarpa, Roxb., but with smaller flowers and larger leaves.

EUGENIA JAVANICA, Lamk. Dict. III, 200. A glabrous tree, 25 to 35 feet high: young branches terete, pale-brown. Leaves thinly coriaceous, elliptic-oblong, elliptic-lanceolate or elliptic, the apex acute or subacute, slightly narrowed to the rounded (sometimes slightly cordate) base; both surfaces pale-brown when dry: main-nerves slightly conspicuous on the lower surface, 8 to 12 pairs, slightly curved, spreading, interarching about 1 in. from the edge; length 4 to 8 in.; breadth 1.75 to 3.5 in.; petiole 1 to 2 in. Flowers 1 in. or slightly more in diam. (excluding the stamens) white, in axillary or terminal lax pedunculate fewflowered corymbose racemes; peduncle of racemes from 1 to 1.25 in. in length; pedicels of flowers 4 to 6 in. long. Calyx-tube clavateturbinate, smooth, 35 to 5 in. long, tapering into a short pseudo-stalk. the 4 lobes broad, unequal, rounded, blunt, concave. Petals obovateorbicular, larger than the sepals. Filaments slender, about '75 in, long. Fruit when quite ripe depressed-turbinate, about 1.5 in. long and 2 in. broad at the apex, pale-yellowish, 1- or few-seeded, the endocarp spongy. Duthie in Hook. fil. Fl. Br. Ind. II, 474; Kurz in Journ. As. Soc. Beng. XLVI, (1877), Pt. 2, 69; For. Fl. Brit. Burm. I, 494. E. alba, Roxb. Hort. Beng. 39; Fl. Ind. II, 493; Wall. Cat. 3612A, 3614 all the Jambosa alba, Rumph Herb. Amb. I, 127, t. 39; W. & A. Prodr. I, 332; Wight Ill. II, 14; Ic. t. 548; Miq. Fl. Ind. Bat. I, Pt. 1. 443 (in part). J. samarangensis, Korth. in Ned. Kruidk. Arch. I, 201: Blume Mus. Bot. I, 95. Jambosa macrophylla, DC. Prod. III. 286 (in part). Myrtus samarangensis, Blume Bijdr. 1084. Jambosa insignis, Bl. Mus. Bot. I, 100. Jambosa ambigua, Bl. Mus. Bot. I, 96.

Malacca: Griffith 2352, Maingay 748, Hervey. SINGAPORE: Ridley 8931. Andaman and Nicobar islands (very common). Distrib.—Java, Zollinger, 2nd Journey 808, etc.; Timor Laut, Forbes 334; New Guinea and many of the other islands of the Archipelago.

Distinguished in the group by its shortly petiolate leaves and pedunculate lax racemes which are often terminal.

var. Roxburghiana, Duthie in Fl. Br. Ind. II, 475; leaves almost sessile, cordate and amplexical at the base, the apex rounded. E. decora, Wall. Cat. 3608.

4. EUGENIA JAMBOS, Linn. Sp. Pl. 47. A shrub or small glabrous tree: young branches more or less four-angled, pale-brown, rather slender. Leaves thinly coriaceous, oblong-lanceolate, tapering to each end, the apex acuminate (sometimes almost caudate) the base more abruptly narrowed to the petiole; both surfaces pale-olivaceous when dry; the main-nerves distinct on the lower, 10 to 14 pairs, slightly curved, ascending, interarching in a rather faint nerve 'l in inside the edge, the secondary nerves rather distinct, one (sometimes two) between each pair of primaries; length 4 to 7 in.; breadth 1 to 1.6 in.; petiole 25 in. Flowers 2.5 to 3 in. in diam., in few-flowered terminal racemes shorter than the leaves, the pedicels 3 to 4 in long. Calyx-tube turbinate, 5 in. long, the lobes 4, broad, short, reflexed. Petals much larger than the calyx-lobes, obovate-rotund, about 5 in. long; filaments 15 to 2 in. long, shorter than the style. Fruit ovoid or globular, 1.5 to 2 in long, dull-yellow tinged with pink, smooth, endocarp fleshy and edible. crowned by the inflexed calyx-lobes. Seeds one or two. Roxb. Hort. Beng. 37; Fl. Ind. II, 494; Wall. Cat. 3615; Wight Ill. II, 14; Duthie in Hook. fil. Fl. Br. Ind. II, 474. Brandis For. Fl. 233; Kurz in Journ. As. Soc. Beng. XLVI. (1877) Pt. 2, 69; For. Fl. Brit. Burm. I, 495. Jambosa vulgaris, DC.; Blume Mus. Bot. I, 93; W. & A. Prodr. I, 332; Bot. Mag. 3356; Miq. Fl. Ind. Bat. I, Pt. 1, 425; Wight Ic. 435. Myrtus Jambos, Kunth; Korth. in Ned. Kruidk. Arch. I, (1846), 200; Blume Bijdr. 1085.—Rumph. Herb. Amb. I, 123; Rheede Hort. Mal. I, 27, f. 17.

Cultivated in most of the provinces: perhaps wild in Perak; Scortechini; Maingay 735. Cultivated also in British India.

Readily distinguished in this section by its narrow leaves attenuated to each end and few-flowered terminal racemes.

5. EUGENIA MALACCENSIS, Linn. Sp. Plantar. 470. A glabrous tree, 30 to 40 feet high; young branches almost terete (slightly compressed) with pale bark. Leaves corinceous, with short but distinct petioles, narrowly elliptic-oblong to oblanceolate-oblong, the apex more or less suddenly acute, the base much tapered to the petiole: when dry the upper

surface olivaceous the lower pale-brown: main-nerves 10 to 12 pairs, slightly curved upwards, interarching to form a marginal nerve 1 in. to '15 in. from the edge; length 6 to 11 in.; breadth 1.75 to 3 in.; petiole 3 to 5 in. Flowers 1 to 1.5 in. in diameter, in sessile or shortly pedunculate fascicles of three from the branches below the leaves. Calyx-tube obconic about 5 in. long, tapering into the quarter inch long ebracteolate pedicel; calyx-lobes 4, broadly rounded, corraceous, not reflexed. Petals orbicular, with a broad claw, the edges thin, about 4 in. in diam. (when dry). Fruit about the size of a hen's egg, obovate, turbinate to elliptic-ovoid, smooth and glossy, from pale-rose-coloured to dark-purple, crowned by the inflexed calyx-lobes, edible. Seed usually solitary. Duthie in Hook. fil. Fl. Brit. India. II, 471; Roxb. Fl. Ind. II, 483; Wall. Cat. 3611; Wight Ill. II, 14, t. 98; Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 68; For. Fl. Brit. Burm. I, 493. E. macrophylla, Lam. Encyc. III. 196. Jambosa malaccensis, DC. Prod. III, 286; Korth. in Ned. Kruidk. (1847), 200; Bot. Mag. 4408; W. & A. Prodr. I, 332. J. purpurascens, DC. l.c. excl. syn. Roxb. J. domestica, Rumph. Herb. Amb. I, 121, t. 37 (not good) and 38, f. i; DC. lc. 288; Blume Mus. Bot. I, 91; Mig. Fl. Ind. Bat. I, Pt. 1, 411. Myrtus macrophylla, Spreng.; Blume Bijdr. 1084. M. malaccensis, Spreng.; Blume l.c. 1083. -Burm. Fl. Ind. 114; Rheede Hort. Mal. I, 29, t. 18.

Doubtfully wild in any of the Provinces, but frequently cultivated as it also is in Burma, the Malayan Islands and British India.

The variety with very dark purple ovoid-elliptic fruit was described as a species by Roxburgh and has the following synonymy:—Eugenia purpurea, Roxb. Hort. Beng. 37; Fl. Ind. II, 483; Wight Ill. II, 14; Ic. II, 549. Jambosa purpurea, Wall. Cat. 3610. J. domestica, var. purpurea, Blume Mus. Bot. I, 92; Miq. l.c.—J. nigra, Rumph. Amb. 125, t. 38, fig. 1?

6. Eugenia pseudo-formosa, King n. sp. A glabrous shrub; young branches slender, sub-terete, compressed near the nodes, pale. Leaves sub-coriaceous, elliptic or oblong-elliptic, acuminate, slightly narrowed to the rounded base; upper surface olivaceous-brown when dry, the lower pale yellowish-brown; main-nerves 14 to 20 pairs, curving upwards, interarching 15 to 25 in. from the margin; length 7 to 12 in.; breadth 3 to 5 in.; petiole 1 or 2 in. long, or absent. Flowers white tinged with red, sessile in densely crowded fascicles or very condensed cymes at the apices of the branches, 6 in. in diam., the buds globular. Calyx 4 in. long; the tube cylindric-campanulate, the mouth with 4 broad blunt lobes becoming hardly triangular. Petals orbicular. Style 1.5 in. long. Stamens and fruit unknown.

PERAK: Wray 1809, 3581; King's Collector 3401, 5389, 6254; Scortechini. SINGAPORE: Ridley 9520.

A species resembling E. formosa in its shrubby habit and its leaves; the latter are however thinner in texture and they have more numerous nerves. The flowers of this are however sessile fasciculate and much smaller in size. Wray 3688 and Ridley 9628, which has its clavate flower buds in very short racemes, is probably a form of this species. E. samarangensis DC. much resembles this but has its flowers in small racemes or panicles.

7. EUGENIA PAPILLOSA, Duthie in Hook. fil. Fl. Br. Ind. II, 495. A tree 40 to 50 feet high: young branches stout about as thick as a goose-quill, terete, brown, those of the inflorescence 4-angled. Leaves coriaceous, somewhat amplexicaul, oblong-elliptic sometimes obovateelliptic or lanceolate, subacute or blunt, narrowed to the cordate auriculate sub-amplexicaul base; upper surface smooth, shining, dark-olivaceous or blackish-brown; under surface reddish-brown; main-nerves 16 to 20 pairs, curving slightly upwards and interarching 1 to 2 in. from the edge, very prominent on the lower surface like the mid-rib, inconspicuous or depressed on the upper; length 8 to 12 in.; breadth 3 to 5 in.; petiole less than 1, very thick. Panicles pedunculate, crowded. at the apices of the youngest shoots or axillary, shorter than the leaves: the branches mostly short, divaricate, scurfy like the branchlets. Flowers (the stamens included) 6 in. long, sessile and collected in globose-clavate bracteate heads of 5 to 8 at the apices of the branchlets; the bracts oblong, blunt, deciduous. Calyx :35 in. long, funnel-shaped, narrowed above the middle to a pseudo-stalk: the limb wide and with 4 broadly triangular, unequal, reflexed, blunt lobes. Petals orbicular, three times as long as the calyx-lobes, not much shorter than the stamens. Fruit unknown. E. anacardifolia, King MSS.

Malacca; Manigay (K.D.) 737; Holmberg 873. Singapore: Ridley 3829. Perak: Scortechini; King's Collector 2813, 5869, 8475.

8. Eugenia densifiona, Duthie in Hook. fil. Fl. Br. Ind. II, 473. Shrubby, occasionally arboreous, glabrons: young branches compressed, pale-brown. Leaves coriaceous, narrowly elliptic-oblong, acuminate, the base cuneate, both surfaces glabrous, shining, finely reticulate, the upper olivaceous (when dry) the lower pale-brown; main-nerves 12 to 20 pairs, slender but distinct on both surfaces (when dry), ascending slightly, curved and interarching 3 to 4 in from the edge, a second series of short arches being interposed between these and the margin; length 5 to 8 in.; breadth 1.75 to 2.5 in.; petiole 35 to 5 in. Panicles terminal, many-flowered, compact; the branchlets numerous and fewflowered. Flower-buds clavate, about 5 in. long just before expansion. Flowers about 75 in. across, white, much tinged with red. Calyx-tube funnel-shaped, 3 to 4 in. long, jointed to a stout pedicel shorter than itself; the 4 lobes, 15 in. long, unequal, broad, rounded. Petals much larger than the calyx-lobes, sub-orbicular, much shorter than the

stamens. Fruit as large as a cherry, rose-coloured, globular, with a tough smooth epicarp, the apex crowned by the large calyx-lobes. Seed one, rarely two. Jambosa densiflora, DC. Prod. III, 287; Korth in Ned. Kruidk. Arch. I, 200; Blume Mus. Bot. I, 93; Miq. Fl. Ind. Bat. I, Pt. 1, 416. Myrtus densiflora, Blume Bijdr. 1087. Eugenia corymbosa, Roxb. Fl. Ind. III, 497; Wight Ic. 627.

Malacca: Mainyay (K.D.) 760/1 762/2 (? 758). Perak: King's Collector 738, 4355, 4682, 5721, 5855, 5868, 7065, 8102, 10940; Scortechini 149, 743; Wray 544. Singapore: Ridley 356, 5072. Pahang: Ridley 2646. Penang: Curtis 3431. Distrib.—Sumatra, Java.

A very handsome species somewhat resembling E. Jambos, L. but distinguished by its dense terminal panicles of flowers which are individually smaller than those of that species, also by its broader leaves, and smaller fruit; allied to E. pendens, Duthie and E. garcinifolia, King.

9. Eugenia plumbea, King n. sp. A glabrous tree; young branches only as thick as a crow-quill, 4-angled, with dark bark. Leaves thinly coriaceous, lanceolate, acuminate, somewhat narrowed at the base; both surfaces of a dull leaden colour when dry, the upper shining, the lower dull; main-nerves 10 to 12 pairs, prominent on the lower, depressed on the upper surface; length 3 to 4 in.; breadth 1 to 1.5 in.; petiole 1 in. Flowers about .75 in. in diam., greenish-white, in terminal or axillary shortly pedunculate racemes of about three. Calya 6 in. long, campanulate or widely funnel-shaped, suddenly contracted just above its insertion on the short pedicel; the mouth wide, divided into four broad, rounded segments .15 in. long. Petals rotund-reniform, longer than the calyx-teeth, shorter than the stamens. Fruit unknown.

PERAK: on Gunong Pateh, elevat. 3400 feet; Wray 479.

A species resembling this has been collected in Borneo by Mr. Ridley (Herb. Ridley 9071).

10. Eugenia Scortechini, King n. sp. A glabrous shrub or tree: young branches thicker than a crow-quill, boldly 4-angled, winged below the nodes. Leaves scantily pellucid-dotted, sub-coriaceous, ovate-oblong to oblong-lanceolate, acute rarely acuminate, narrowed to the rounded occasionally minutely cordate base; both surfaces brown when dry, the lower paler; main nerves 7 to 10 pairs, prominent on the lower surface, curving upwards, and joining to form a bold nerve 2 in. from the edge, between which and the edge is a second series of minute arches; length 4 to 6 in.; breadth 1:35 to 2:35 in.; petiole 15 in. sometimes absent. Racemes terminal and in the upper leaf-axils, corymbose, condensed, very much shorter than the leaves, 3- to 9-flowered. Flowers pale-red, with some yellow in the centre, about 65 in. in diam., on very short pedicels. Calya shortly and widely campanulate, 4 in. long,

smooth, the mouth with very broad short unequal lobes, very little contracted at the base. Petals red, orbicular, longer than the calyxlobes, much shorter than the stamens. Fruit broadly oblong, the apex truncate and crowned by the thick, deep, cup-shaped calyx, about 5 inlong, the base abruptly contracted into a short pseudo-stalk.

Perak: Scortechini 649; King's Collector 4734, 7801, 10076.

MALACCA: Manigay (K.D.) 736.

This resembles *E. diospyrifolia*, Wall., but that species has long-stalked flowers, with a narrower calyx-tube, and the nervation of the leaves is different. This also resembles *E. coarctata*, Blume, which however differs in having pale terete young branches and larger leaves, and *E. æmula*, Blume, from which it differs in the number of the nerves of the leaves and in its thicker young branches. From *E. macrocarpa*, Roxb., this differs in its much thinner quadrangular branches and much smaller flowers and fruit.

VAR. parvifolia; leaves narrowly oblong-lanceolate, only from 3 to 6 in. long and 8 to 1.25 in. broad.

PERAK: King's Collector 3348, 10437.

11. EUGENIA MOLLIS, King n. sp. A hairy shrub or small tree: young branches slender, pale-brown, 4-angled like the rachis and branches of the panicle but not winged, covered with short, thick, brown hairs. Leaves sub-coriaceous, oblong-lanceolate, the apex finely acuminate. slightly narrowed to the rounded, slightly cordate base; upper surface pale olivaceous-brown, subglabrous; the lower darker and everywhere covered with hairs like those on the young branches and inflorescence; length 8 to 12 in.; breadth 1.75 to 4 in.; petiole 1 to 2 in. Panicles terminal, shortly pedunculate, nearly as long as the leaves; the branches spreading and more or less trichotomous at their extremities. Flowers numerous but not crowded, about 5 in. across when expanded. Calyxtube 4 in. long, clavate, densely and minutely scurfy-hairy tapering much to the short pedicel; the mouth 3 in. across, divided into 4 subequal rounded lobes about 1 in. long, their edges thin and glabrous. Petals orbicular, white, much longer than the calyx-lobes. Fruit ovoidglobose, crowned by the cupular calyx, covered with deciduous scurflike hairs, 6 in. long.

Perak: King's Collector 2686, 2808, 5572, 8387; Wray 2372. Distrib.—Sumatra, Forbes 1475.

12. Eugenia Quadrata, King n. sp. A glabrous tree, 20 to 30 feet high: young branches as thick as a goose-quill, acutely 4-angled and narrowly winged, pale-brown. Leaves thinly coriaceous, narrowly oblong, much acuminate, slightly narrowed and cordate at the rounded base; upper surface pale olivaceous-brown when dry, the lower darker brown and often not olivaceous; main-nerves 20 to 25 pairs, slender,

distinct, interarching '1 in. from the margin; the reticulations minute; length 8 to 10 in.; breadth 1.75 to 2.75 in.; petiole very short '05 in. long. Cymes very short, glomerulate, 3-flowered, pedunculate, solitary and axillary or in groups of 3 or 4 and terminal, about 2 to 3 in. long; their peduncles compressed, 1 to 1.5 in. long. Flowers white, about '75 in. in diam.: calyx-tube '5 in. long, widely campanulate, suddenly contracted into a long pseudo-stalk, epedicellate; calyx-lobes 4, unequal, broad, rounded, only '1 in. long or less, reflexed. Petals orbicular, much larger than the calyx-lobes. Stamens slightly exceeding the petals. Fruit unknown.

PERAK: King's Collector 5547.

In shape and nervation the leaves of this somewhat resemble those of  $\it E.\ mollis$ , King.

13. Eugenia scalarinervis, King n. sp. A glabrous tree, 20 to 30 feet high: young branches nearly as thick as the little finger, slightly compressed, pale. Leaves coriaceous, elliptic-ovate, sub-acute, the base rounded and cordate; upper surface brown slightly tinged with olivaceous (when dry), the lower much paler; main-nerves 22 to 30 pairs, very prominent on the lower and depressed on the upper surface, curving very slightly upwards and interarching '15 in, from the margin, the intermediate nerves rather distinct, the reticulations few and large: length 10 to 14 in.; breadth 5 to 7 in.; petiole about '3 in., stout, wrinkled when dry. Flowers in much contracted few-flowered terminal racemes, 1.5 in. or more across. Calyx-tube magenta-coloured (fide collector), smooth, .75 in. long, contracted at the base into a pseudostalk 15 in. long and jointed to a pedicel 15 in. long; the mouth wide, divided into 4 broadly-triangular teeth 15 in, long. Petals unknown. Style about 1 in. long, the stamens shorter. Fruit (unripe) globular-ovoid, crowned by the large, wide-tubular, 4-lobed calvx-limb ·75 in. long.

PERAK: King's Collector 8200; Ridley 3095.

The specimens of this very fine species are scanty and imperfect. It is distinguished by the great size of its leaves and by the large number and the prominence of their sub-horizontal nerves.

14. Eugenia pergamentacea, King n. sp. A tree?; young branches terete, as thick as a quill, pale-brown. Leaves chartaceous-coriaceous, narrowly elliptic-oblong, abruptly and shortly acuminate, the base cuneate; upper surface when dry shining and of a dull leaden-colour; the lower brown, both finely and transversely reticulate; main-nerves 28 to 32 pairs, very regular, straight, slightly ascending, interarching 15 in from the margin, prominent on the lower, depressed on the upper surface; length 12 to 16 in.; breadth 4 to 6 in.; petiole 5

in., laterally compressed. Panicles 3 or 4 inches long, solitary in the leaf-axils or in groups of 2 or 3 at the apices of the branches; the branchlets few, short, spreading, bearing 3 or 4 flowers at their apices. Flowers: 6 in. in diam.; depressed globular in bud. Calyx-tube shortly and widely campanulate, suddenly contracted into a pseudo-stalk: 1 in. long: the teeth 4, short, unequal, rounded, inflexed. Petals 4, orbicular-ovate, pellucid-dotted, not much longer than the stamens, free. Fruit globular, smooth, crowned by the short calyx-cup, 1 in. in diam., black when dry. Syzygium subdecussatum, Wall. Cat. 5589 in part.

PENANG: Curtis 1440.

Since the time of Wallich who issued it along with his Syz. subdecussatum this has been collected by Mr. Curtis only. The elongate leaves of parchment-like texture with many straight very regular nerves and short panicles and globular fruit distinguish it.

15. EUGENIA DYERIANA, King n. sp. A tree, 40 to 50 feet high; young branches as thick as a goose-quill; young branches terete below, compressed near the apex, dark-brown. Leaves thickly coriaceous, elliptic, (oblong in the variety), slightly narrowed at each end; both surfaces dark-brown when dry and shining; the upper with midrib and main-nerves impressed, the reticulations invisible; the lower of a warmer brown colour, the main-nerves and midrib (but not the reticulations) very bold: main-nerves 13 to 20 pairs, slightly curved, ascending, interarching '1 in. or more from the recurved edge; length 7 to 9 in.; breadth 3.5 to 5 in.; petiole 4 to 6 in.; short. Panicles narrow, few-flowered, much shorter than the leaves, terminal or from the upper leaf-axils, usually pedunculate: branches few, short, spreading, much compressed, the flowers crowded at their apices. Flowers 4 in. across when expanded, sessile, obovoid in bud. Calyx campanulate, 3 in. long, abruptly constricted into a very short pseudo-stalk, the mouth wide and with 4 small rounded lobes. Petals 4, free, not calvotrate, orbicular. Stamens white, only 25 in. long. Fruit (unripe) globular, smooth, crowned by the small, short, circular remains of the calyx, '75 in. in diam.

PERAK: Scortechini 2018; Wray 2094; King's Collector 6196, 6404, 6767.

VAR. oblonga; leaves oblong or narrowly oblong-elliptic, 4 to 8 in. long and 1.25 to 2.75 in. broad; panieles nearly as long as the leaves.

PERAK: King's Collector 7669.

A species near E. Clarkeana, King, but with larger leaves with more nerves, larger flowers but smaller panicles.

16. EUGENIA HEMSLEYANA, King n. sp. A tree, 30 or 40 feet high: young branches thinner than a goose-quill, the bark yellowish-grey. 518

Leaves large, rigidly coriaceous, elliptic or elliptic-oblong, shortly and bluntly acuminate, slightly narrowed at the base; both surfaces, but especially the upper, dark when dry, the upper shining with the nerves impressed, the lower somewhat paler, dull and the nerves prominent; main-nerves 20 to 25 pairs, slightly curved upwards and interarching 1 to 2 in. from the edge: length 6 to 9 in.; breadth 3 to 35 in.; petiole 3 to 35 in. stout. Panicles mostly on long 4-angled striate peduncles, terminal, shorter than the leaves, crowded in groups of 6 to 8 at the apices of the twigs; branches few, a long one often from the very base, the remaining short (mostly under one inch), all compressed, and each bearing at its apex a dense capitule of sessile flowers 3 or 4 in. across. Calyx 15 in. long, campanulate, contracted and ribbed at the base but not forming a pseudo-stalk; the mouth with 4 broad, rounded, concave teeth. Fruit (unripe) globular with numerous bold vertical ribs, the apex crowned by the calyx-lobes.

PERAK: Wray 1803; King's Collector 6114, 8697.

The species nearest to this is *E. pergamentacea* which however has larger leaves, fewer panicles and considerably larger flowers.

17. EUGENIA PACHYPHYLLA, Kurz in Journ. As. Soc. Beng. XLII, Pt. 2, 332. A glabrous tree: the young branches slender, terete, paleyellow when dry. Leaves coriaceous, obovate to obovate-oblong, the apex abruptly and broadly apiculate, the base cuneate; upper surface olivaceous-brown when dry, the lower pale-brown: main-nerves 12 to 15 pairs, slender but distinct on the lower surface, spreading, slightly curved and interarching about 'l in. from the margin, length 3.5 to 5 in.; breadth 2 to 2.25 in.; petiole 2 to 3 in. Flowers 3 in. in diam. in pedunculate few-flowered corymbose racemes or panicles axillary or clustered at the apices of the branches, the common peduncles 1 to 1.5 in, long, those of the branchlets (in the panicles) half as long, all 4-angled, the flowers themselves sessile at the apices, the buds globoseclavate. Calyx in the expanded flower '4 in. long, widely funnelshaped, suddenly contracted into a cylindric tube, the 4 lobes of the mouth about 2 in. long, broad, rounded. Petals sub-orbicular, larger than the calyx-lobes. Stamens '4 in. long. Fruit unknown. Kurz For. Fl. Br. Burma I, 490; Duthie in Hook. fil. Fl. Br. Ind. II, 477.

MALACCA: Griffith (K.D.) 2371/1: Maingay (K.D.) 742. DISTRIB.—Burma, Brandis 1337.

A species poorly represented at Kew and Calcutta; recognised by its obovate leaves, pale yellow branches, and few-flowered, pedunculate, corymbose\_racemes or panicles.

18. EUGENIA LEPIDOCARPA, Wall. Cat. 3618. A glabrous tree, 40 to 50 feet high: young branches greyish, terete, Leaves coriaceous,

ovate-oblong to broadly ovate, rarely obovate-oblong, the apex blunt with a short abrupt point, or sub-acute, the base slightly cuneate, both surfaces deep-olivaceous brown the upper somewhat shining, the lower dull: main-nerves 10 to 12 pairs, rather straight, slightly ascending and interarching with an intramarginal nerve close to the edge, not conspicuous on either surface: length 3 to 4.5 in.; breadth 1.75 to 2.75 in.; petiole 3 to 5 in. Panicles mostly in clusters at the apices of the branches, pedunculate, or shorter than the leaves; branchlets 4-angled, spreading, few-flowered, the flowers sessile, or nearly so, clustered at the apices, 25 to 3 in. in diam. Calyx clavate-rotund, about 2 in. long just before expansion, vertically ribbed, tapering to the base; the lobes 4, unequal, less than 1 in. long, broad. Petals rotund, larger than the calvx-lobes. Fruit globular-ovoid crowned by the cupular calvx, vertically ribbed, '4 in. in diam. (unripe). Duthie in Hook. fil. Fl. Br. Ind. II, 466; Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 68. E. grandis, Wight VAR. lepidocarpa, For. Fl. Br. Burma I, 490.

SINGAPORE: Ridley 1643, 4633, 4657, 4972, 6307, 6308, 8408; Wallich 3618; Walker; Hullet; King. Malacca: Griffith 2369, 2376, 2373, 2369, 2416; Maingay 725, 757, 759; Hervey; Derry. Perak: Wray 415, 3907, 3914, 3908; King's Collector 10042. DISTRIB.—Burma.

A species in many respects resembling *E. grandis*, Wight, but with smaller less shining leaves with fewer nerves and broader in proportion to length: shorter panicles, smaller flowers which moreover are mostly sessile, and smaller, ribbed fruit.

19. Eugenia garcinifolia, King n. sp. A glabrous tree, 60 to 80 feet high; young branches slender, compressed, 6-ridged, brown. Leaves thickly coriaceous, elliptic, or elliptic-oblong, the apex with a short abrupt point, slightly narrowed to the sub-acute or rounded base, the edges recurved when dry: both surfaces (when dry) shining, conspicuously reticulate, pale-olivaceous brown, the upper rather the darker, main-nerves 10 to 12 pairs, rather prominent beneath, interarching irregularly 2 to 3 in. from the edge, some of the secondary nerves as prominent as the main ones; the reticulations minute but distinct; length 5 to 10 in.; breadth 2 to 3.5 in.; petiole 2 to 3 in. Panicles terminal, spreading, 3 or 4 in. across and scarcely as much long. Flowers probably on thick striate pedicles 25 in. long. Calyx narrowly campanulate, 5 in. long, the mouth with 4 unequal, short, rounded teeth. Petals orbicular. Stamens unknown. Fruit (young) globular-ovoid, crowned by the 4 triangular calyx-teeth.

PERAK: King's Collector 4541, 6974. SUMATRA: Scortechini 365.

A species allied to E. densifiora, Duthie, but with a less dense inflorescence and larger flower-buds. The leaves of this moreover are larger and thicker, the reticulations more marked and the edges recurved.

20. Eugenia crenulata, Duthie in Hook. fil. Fl. Br. Ind. II, 490. A glabrous tree: young branches as thick as a goose-quill, terete, brown. Leaves thickly coriaceous, elliptic or elliptic-rotund, the apex rounded but with an abrupt short apiculus, the base cuneate; both surfaces (when dry), shining, the numerous reticulations and nerves distinct, the intramarginal nerve very close to the thickened and slightly crenate edge; under surface rather remotely black-pustulate; length 4 to 5 in.; breadth 2.5 to 4 in.; petiole 3 to 6 in. Panicles terminal, nearly as long as the leaves when in bud, (sometimes longer), corymbosely trichotomus, many-flowered; the peduncle and branches 4-angled, compressed, the nodes and the insertions of the flowers with minute bracteoles. Flowers (including the stamens) 4 in. long, sessile. Petals 4, calyptrate. Calyx 2 in. long, campanulate with a truncate mouth, contracted for half its length into a pseudo-stalk. Fruit unknown.

MALACCA: Maingay (K.D.) 739. SINGAPORE: Ridley 6232.

Recognisable at once by its crenate leaves; only twice collected and evidently rare. The Singapore specimen has thinner leaves and more slender longer panicles but, in other respects, it agrees with the Malacca one.

21. EUGENIA GRANDIS, Wight Ill. II, 17: Ic. t. 535. A glabrous tree. 30 or 40 feet high: young branches terete, dark-brown. Leaves thickly coriaceous, ovate-rotund to ovate-elliptic or elliptic-oblong, the apex rounded with or without an abrupt short blunt point, or subacute or acute, the base always narrowed to the petiole: both surfaces shining; and the upper olivaceous, the lower brown when dry: mainnerves 12 to 14 pairs, curving upwards very slightly and interarching, with an intermarginal nerve 1 to 2 in. from the edge: the secondary nerves and lax reticulations slender but distinct like the main ones on both surfaces, length 3.5 to 7 in.; breadth 1.75 to 4 in.; petiole .4 to .65 in. Panicles mostly clustered at the apices of the branches, more than half as long as the leaves, on peduncles 6 to 1.25 in. long; the branches spreading, an inch or more long. Flowers sessile at the ends of the branches, 35 to 45 in. in diam. when expanded; the buds just before expansion clavate-rotund, 5 in. long. Calyx clavate, tapered to the short pedicel, 35 to 5 in. long, smooth, the 4 lobes concave, orbicular, about 2 in. long, two much larger than the others. Petals of the same size and shape as the calyx-lobes. Filaments 35 in. long. Ripe fruit oblong-ovoid, 1.5 in. long, crowned by the cup-shaped calyx-limb, 1-seeded. Duthie in Hook. fil. Fl. Br. India I, 475; Kurz in Journ. As. Soc. Beng. XLVI, (1877), Pt. 2, 67; For. Fl. Brit. Burm. I, 489. E. firma, Wall. Cat. 3603; not of DC. E. cymosa, Roxb. Hort. Beng. 37; Fl. Ind. II, 492; not of Lam. Jambosa grandis, Blume Mus. Bot. I, 108. J. firma, Blume l.c. J. urceoluta, Korth. in Mig. Fl. Ind. Bat. I.

Pt. 1, 418 in part. Syzygium grande, Walp. Repert. II, 180; not of Wall. Cat. 3554. S. firmum, Thwaites Enum. 417. S. montanum, Thwaites l.c. 116.

MALACCA: Griffith (K.D.) 2368, 2369, 2370, 2371; Maingay 730, 723. SINGAPORE: Ridley 4633; Hullet. Langkawi: Ourtis. Penang: Curtis 7515. Distrib.—British India in Burma, Chittagong, Sylhet and Assam.

A species easily recognised by its thick glossy reticulate leaves, large (mostly) terminal panicles with large flower-buds and ovoid-cylindric smooth fruit crowned by the cup-shaped calyx-lobes.

Included under this both by Duthie in the Flora of British India and by Trimen in his Flora of Ceylon, is a Ceylon plant (Thwaites C.P. 2694 which he named S. insigne). This plant has quite the leaves of E. grandis, but the flower buds are much larger and if flowers and fruit were available it would probably turn out to be specifically distinct. E. grandis, Wight, is allied closely to E. lepidocarpa, Wall.

22. Eugenia Thumra, Roxb. var. penangiana, King. A medium-sized tree; young branches somewhat thinner than a goose-quill; the bark rough, brown. Leaves coriaceous, oblong-elliptic or oblong-lanceolate, sub-acute or bluntly and very shortly acuminate, the base cuneate; both surfaces dull; the upper dark leaden-brown, the nerves and midrib impressed; lower surface dark-brown, the nerves and midrib prominent; main-nerves 15 to 20 pairs, curving upwards, interarching 'l infrom the edge; length 4 to 5 in.; breadth 1.8 to 2 in.; petiole '3 to '5 in. Panicles nearly as long as the leaves, terminal and axillary, pedunculate, lax; the branches numerous, spreading, 4-angled like the peduncle, the smaller compressed. Flowers '35 in. long (including the stamens), sessile, white, crowded, 5 or 10 together at the apices of the ultimate branchlets, clavate in bud. Calyx funnel-shaped, narrowed for half its length into a ribbed pseudo-stalk, the mouth with 4 broad, suborbicular lobes. Fruit unknown.

Penang: Curtis 2410.

This differs from the typical *E. Thumra*, Roxb., in having narrower leaves with fewer nerves and rather shorter panicles the branches of which are more acutely 4-angled. Fruit of this is unknown: when found it may yield characters warranting the separation of this as a distinct species.

23. Eugenia Griffithi, Duthie in Hook fil. Fl. Br. Ind. II, 481. A tree, 50 to 80 feet high; young branches thinner than a goose-quill, their bark brown and rather rough. Leaves coriaceous, oblong or narrowly elliptic, narrowed about equally at base and apex, both surfaces dark-brown when dry, shining; main-nerves 15 to 20 pairs, spreading, rather straight, interarching 1 in. from the edge, depressed on the upper and prominent on the lower surface, reticulations small, indistinct; length 4.5 to 6 in.; breadth 2 to 2.5 in.; petiole 2 to 3 in.

Panicles small, racemose, in clusters of 6 to 8 at the apices of the branches, few-flowered, unequal in length but all shorter than the leaves and on more or less long, compressed, dark-coloured peduncles; the branches few, unequal in length but all under an inch, compressed; flowers in threes, sessile at the apices of the branchlets, the buds clavate. Calyx campanulate, 25 in. long, constricted for more than half its length into a thick pseudo-stalk: the mouth with 4 broad, rounded lobes. Petals 4, orbicular not calyptrate. Fruit (unripe) globular-ovoid, slightly corrugated, crowned by the small circular remains of the calyx.

Malacca: Griffith (K.D.) 2375. Perak: Wray 2713; King's Collector 6192. Singapore: Ridley 4980, 4981, 7951.

24. EUGENIA CLARKEANA, King, n. sp. A tree 30 to 50 feet high: young branches as stout as a quill, terete, compressed near the nodes, brown. Leaves coriaceous, elliptic-oblong to elliptic, very shortly acuminate, gradually narrowed from about or below the middle to the acute base; upper surface dark-brown, shining, not reticulate, the nerves faintly impressed; lower liver-coloured, rather dull, with numerous small pustules, the 12 to 16 pairs of curved main-nerves slightly prominent, the intramarginal nerves about 'I in. distant from the slightly recurved edge, reticulations invisible; length 4.5 to 8 in.; breadth 1.75 to 3 in.; petiole 3 to 35 in. Panicles mostly terminal, shorter than the leaves, pyramidal, with many 4-angled, often compressed branches. Flowers sessile, in densely crowded capitules at the apices of the branchlets, about 35 in, across when expanded, white. Petals 4 or 5, free, broadly oblong, not calyptrate. Calyx widely campanulate, nearly 2 in. long, constricted at the base, rugulose; its mouth with 4 broad, shallow, blunt lobes. Fruit globular and 1-seeded or depressed-reniform and 2-seeded, vertically corrugated when young, rugulose when ripe, shining, black, crowned by the small circular remains of the calyx; the globular form •75 in. or more in diam., the reniform form about 1 in. long and 1.35 in. broad; pulp none.

PERAK: Scortechini 205; King's Collector 3349, 3491, 3573, 6822, 7811.

Allied to E. Griffithii, Duthie, but with a single large terminal panicle instead of a number of small ones and with smaller flowers.

25. EUGENIA CORRUGATA, King n. sp. A tree, 30 to 60 feet high; young branches terete but compressed at the apices thinner than a goose-quill, brown. Leaves as in E. Clarkeana, but the main-nerves not depressed on the upper surface. Panicles terminal, short and fewbranched; the branches terete. Flowers not seen. Fruit globular, much corrugated and vertically ridged, especially towards the base and

apex, depressed-globose, the rind '25 in. thick, when fully ripe, greenish-yellow, and 2 to 3 in. in diam.

PERAK: King's Collector 5298, 6987.

EUGENIA PENDENS, Duthie in Hook. fil. Fl. Br. Ind. II, 475. A small tree with pendent branches: young branches compressed, slender, brown. Leaves thinly coriaceous, pellucidly dotted, narrowly oblong-elliptic or elliptic, occasionally somewhat oblanceolate, the apex shortly and rather abruptly acuminate, the base cuneate; both surfaces olivaceous when dry: main-nerves 10 to 12 pairs, slender, ascending, slightly curved, interarching 2 in. from the margin, secondary nerves and reticulations indistinct; length 5 to 7 in.; breadth 1.4 to 3 in.; petiole 3 to 35 in. Panicles terminal, about 2 in. in diam., condensed, the branchlets about 5-flowered. Flower-buds globose-clavate, 5 in. long just before expansion. Flowers when expanded nearly '5 in. Calyx-tube narrowly funnel-shaped, jointed to a pedicel shorter than itself: lobes short, rounded, subequal, reflexed. Petals orbicular, longer than the calvx-lobes. Stamens '75 in. long. Fruit depressedglobular, green flushed with red, smooth, crowned by the short reflexed calvx-lobes, 1 in. in diam.

MALACCA: Griffith 2349; Maingay 747; Hervey. Johore: Ridley 4200. SINGAPORE: Ridley 8048, 8447. Perak: Scortechini 1809, 2021; Wray 3537. Penang: Ridley 10242. Distrib.—Sumatra, Forbes 1377.

A species allied to *E. densifora*, Duthie, but with leaves of thinner texture, with fewer nerves and no dots. The panicles are also much shorter, fewer-flowered, and the flowers are smaller.

27. EUGENIA BURKILLIANA, King n. sp. A tree, 40 to 60 feet high: young branches thinner than a goose-quill, brown. Leaves coriaceous, oblong-lanceolate, shortly acuminate, the base cuneate; both surfaces (when dry) shining, pale brownish-green, the upper pitted, the lower with black dots, the edges slightly recurved; main-nerves 10 to 14 pairs, ascending and forming wide arches 1 to 15 in from the edge, between which and the actual edge is a second intramarginal nerve, the secondary nerves and connecting reticulations almost as prominent, all thin and equally visible on both surfaces, all raised: length 2.25 to 3.5 in.; breadth .9 to 1.25 in.; petiole .35 to .5 in. Panicles terminal, sessile, many-flowered, broader than long, much branched, their tops broadly pyramidal, usually somewhat shorter than the leaves: branches thick, striate, 4-angled, slightly compressed. Flowers '7 in. long including the stamens, reddish before expansion, afterwards white, sessile, in threes at the ends of the branchlets, clavate in bud. Calyx 35 to 4 in. long, striate, funnel-shaped, its lower half gradually narrowed into a

pseudo-stalk: the mouth with 4 broad, rounded, shallow lobes. Petals orbicular, not calyptrate. Fruit unknown.

PERAK: Wray 2785, 3070; King's Collector 4719, 6186.

A species near *E. oblongifolia*, Duthie, but differing in its leaves, which are of the same colour on each surface and have more distinct nerves and reticulations equally visible on both surfaces. The mouth of the calyx too is different, being deeply 4-lobed.

28. EUGENIA HELFERI, Duthie in Hook fil. Fl. Br. Ind. II, 480. A considerable tree: young branches indistinctly 4-angled, as thick as a crow-quill, with pale-brown deciduous bark. Leaves narrowly elliptic. tapered to each end, the apex obtusely and shortly acuminate, the base cuneate; both surfaces finely reticulate, pale olivaceous-green, the upper the darker: main-nerves about 12 pairs, faint, interarching close to the edge: the secondary nerves very faint; length 2.5 to 3.25 in.; breadth 1 to 1.25 in.; petiole 2 in. Panicles terminal, solitary, spreading, about half as long or sometimes quite as long as the leaves, the branchlets spreading, their bark exfoliating. Flowers in threes at the ends of the branchlets, about 5 in. across; buds clavate. Calyx-tube funnel-shaped, 2 in. long, attenuated at the base to a pedicel 2 in. long, the 4 lobes of the mouth unequal, short, broad, rounded. Petals broadly orbicular, much longer than the calyx-lobes and half as long as the stamens, bearing large pellucid glands on the exterior like the calyxtube. Fruit unknown.

Penang: Curtis 212. SINGAPORE: Lobb. PERAK: King's Collector 4181. DISTRIB.—Burma (Tenasserim) Helfer 2418.

Closely allied to E. ramosissima, Wall., but with smaller flowers.

29. EUGENIA KURZII, Duthie in Hook. fil. Fl. Br. Ind. II, 478. VAR. ANDAMANICA, King. A tree: young branches as thick as a crowquill, terete, the bark very pale. Leaves thickly membranous, oblongelliptic, the base cuneate, the apex shortly caudate-acuminate; upper surface pale-olivaceous brown when dry, shining, remotely pitted, the main-nerves faint: lower surface paler brown, not olivaceous, the 10 or 12 pairs of main-nerves rather bold, arching upwards and interarching ·15 to ·2 in. from the edge; length 4·5 to 6 in.; breadth 1·85 to 2·25 in.: petioles 3 to 4 in. Panicles from the axils of the upper leaves, or terminal, shorter than the leaves, often broader than long, spreading, many-flowered; the branches 4-angled, pale. Flowers mostly in threes at the ends of the branchlets, 6 in. long (including the stamens). Calya: 15 in. long; widely campanulate, narrowed into a thick pseudostalk as long as itself; the mouth wide, with 4 broad, rounded, reflexed teeth. Petals 4, free, sub-orbicular, reflexed. Stamens four times as long as the calyx. Fruit unknown.

Andaman Islands, at Hobdaypore; King's Collector.

This differs from typical E. Kurzii in having narrower more acuminate leaves and longer stamens. The young branches moreover have paler bark. Fruit is as yet unknown, but when found it may afford characters to warrant specific rank for this.

30. EUGENIA ANISOSEPALA, Duthie in Hook. fil. Fl. Br. Ind. II. 481. A large tree: young branches terete, thinner than a goose-quill, brown. smooth. Leaves coriaceous, ovate to ovate-lanceolate, shortly acuminate. the base cuneate, both surfaces (when dry) dark-brown, the upper shining and with the nerves rather faint; the lower paler brown, the 12 to 14 pairs of curved main-nerves rather distinct, interarching 1 in. from the edge, the secondary nerves somewhat distinct; length 2.5 to 3.5 in.; breadth 1 to 1.75 in.; petiole .2 to .25 in. Panicles terminal, corymbose, usually shorter than the leaves, the branches numerous, spreading, rather crowded, 4-angled, the peduncle compressed. Flowers 5 in. long (including the stamens), sessile, clavate in bud, in threes at the apices of the branchlets. Calya 3 in. long, campanulateinfundibuliform, its lower half contracted into a pseudo-stalk; the limb with 4 unequal, broad, rounded lobes (two being larger and sub-petaloid). Petals 4; not calvptrate. Fruit unknown. E. anisosepala, Duthie in Hook, fil. Fl. Br. Ind. II, 481 in part.

MALACCA: Griffith (K.D.) 2380, 2381. Maingay (K.D.) 754, 753 (in part). MALACCA: Derry 289.

Mr. Duthie remarks that the Griffithian specimens above quoted differ somewhat from those of Maingay inasmuch as they have smaller flowers. With these Mr. Derry's single specimen agrees. Maingay's specimens have a much larger more spreading panicle, with smaller flowers. The material is very poor and I think it is likely that, when more is forthcoming, it will be found that two species are mixed under the name E. anisosepala, Duthie.

31. Eugenia Gageana, King n. sp. A tree, 40 to 50 feet high: young branches thinner than a goose-quill, terete, compressed at the nodes, brown (when dry). Leaves thickly coriaceous, oblong-lanceolate, bluntly acuminate, the base cuneate; upper surface dull-brown, the midrib thin and depressed, the main-nerves faint: lower surface paler brown, the midrib thick and the reticulations and secondary nerves numerous and distinct; the main-nerves 12 to 18 pairs, curving upwards and interarching 1 in from the edge: length 5 or 6 in.; breadth 1.5 to 2.25 in.; petiole 25 to 3 in. Panicles terminal, about half as long as the leaves, sessile, corymbose, many-flowered, branching from the base; branches stout, spreading, obtusely 4-angled. Flowers sessile, in threes at the apices of the branchlets, globose-clavate in bud. Calyx narrowly campanulate, rather abruptly narrowed into a pseudo-stalk about 05 in. in length. Fruit unknown.

PERAK: King's Collector 7563.

32. EUGENIA HULLETIANA, King n. sp. A tree, 20 to 25 feet high; young branches thicker than a crow-quill, terete, brown. Leaves thinly coriaceous, elliptic or elliptic-ovate, with an abrupt, broad, short, apical acumen, the base cuneate, the edge slightly recurved; upper surface somewhat shining, dull-olivaceous; the lower tinged with brown; mainnerves numerous, about 'l in. apart, rather straight, curving upwards at the ends only and there interarching less than 05 in. from the edge, faint on the upper surface and only slightly conspicuous on the lower, the midrib depressed on the upper surface convex on the lower: reticulations almost invisible on the upper, not prominent on the lower surface; length 3.25 to 4.5 in.; breadth 1.5 to 2 in.; petiole 3 to 4 in. Panicles axillary and terminal, as long or nearly as long as the leaves, rather lax, pedunculate; the branches few, spreading, 4-angled, compressed, Flowers pale-green, (the stamens white), in groups of three, sessile at the ends of the branches, about 5 or 6 in. long (including the stamens), clavate in bud. Calyx about 25 in. long. funnel-shaped, the lower two-thirds cylindric and vertically ribbed: the mouth wide, divided into four broad, rounded lobes. Petals 4 suborbicular, reflexed, free. Fruit unknown.

PERAK: King's Collector 7470. DISTRIB.—Sumatra, Ridley 8973.

A species resembling in many respects  $E.\ glauca$ , King, but with larger flowers and differently veined leaves.

33. Eugenia chlorantha, Duthie in Hook. fil. Fl. Br. Ind. II, 487. A small glabrous tree: young branches thin, dark-brown, sub-terete. Leaves coriaceous, elliptic or ovate-elliptic, the apex shortly and abruptly acuminate, the base cuneate, both surfaces olivaceous-green when dry: main-nerves numerous, interarching less than '1 in. from the edge, thin but distinct, the secondary nerves and reticulations also distinct: length 4.5 to 6 in.; breadth 2 to 3 in.; petiole '3 to '35 in. Panicles much shorter than the leaves, axillary and terminal, divaricate, many-flowered, condensed, trichotomous, the branchlets compressed, 4-angled, short. Flowers '3 in. in diam. (excluding the stamens), sessile, clavate. Calyx '35 in. long, contracted into a thick, ridged pseudo-stalk for more than half its length, the mouth with 4 short thick, broad, rounded, spreading or reflexed lobes. Petals orbicular, greenish, not calyptrate. Fruit sub-globular, smooth, crowned by the prominent reflexed or spreading calyx-teeth, '3 to '4 in. in diam.

MALACCA: Griffith (K.D.) 2385; Maingay (K.D.) 733. SINGAPORE: Ridley 445, 3910, 5823, 9220. Pahang: Ridley 1096. Penang: Curtis 180, 1448; Ridley 7957, 7952, 10190. Johore: Ridley 9181. Perak: King's Collector 1277, 4082, 4220, 4076, 6765, 5619, 7511, 8535. DISTRIB—Sumatra, Forbes 3098.

Although the petals of this are greenish, the stamens are of a brilliant red colour and as these are more permanent than the petals the specific name is somewhat misleading. There are however some specimens in which the petals are distinctly stated by the collector to be red.

In the Herbarium the species is readily recognised by the large persistent spreading calyx-lobes which crown the fruit and by the greenish colour of the leaves.

34. EUGENIA PENANGIANA, Duthie in Hook. fil. Fl. Br. Ind. II, 486. A slender glabrous tree, 40 to 80 feet high: young branches sub-terete, ribbed, those of the inflorescence 4-angled, all pale when dry. Leaves corraceous, lanceolate or oblong-lanceolate rarely oblanceolate, obtusely acuminate, the base cuneate; both surfaces yellowish when dry, the lower slightly paler; nerves numerous spreading not prominent on either surface; length 2 to 3 in. rarely 4 in.; breadth '75 to 1.75 in.; petiole 1 to 15 in. Panicles mostly terminal, but a few axillary, 1 to 3 in. long, on slender peduncles, the branchlets numerous divaricate, each bearing at its apex 3 to 5 sessile, white, clavate flowers 5 or 6 in. long. Calya about 4 in. long (longer in fruit), funnel-shaped, abruptly tapering to the base, ribbed (when dry), the limb with 4 or 5 short often obscure teeth. Petals orbicular, equal in number to the calvx-lobes, free. Stamens short. Fruit elongate, gradually tapered to the base from the truncate apex, crowned by the cupular, entire calyx-limb, 5 or 6 in. long.

Penang: Maingay (K.D.) 744; Curtis 193, 2790, 2972. Perak: Scortechini 132, 184, 1368, 3410, 5651, 6965; Wray 3066. Malacca: Derry 1177.

It is possible that two species may be covered by the preceding description as some of the specimens have smaller thinner leaves and flowers with more constricted pseudo-stalks than the type specimen (Maingay 744) on which Mr. Duthie founded the species.

35. EUGENIA RIDLEYI, King n. sp. A tree; young branches thinner than a goose-quill, terete, the bark brown, rather rough. Leaves thinly coriaceous, oblong- or ovate-lanceolate, acute, or acuminate, the base cuneate; both surfaces rather dull when dry, the upper dark olivaceous brown, the nerves impressed; the lower pale warm brown, the midrib and nerves very prominent; main-nerves 7 to 10 pairs, curving upwards and interarching far from the edge, the secondary nerves prominent but the reticulations obscure; length 3.5 to 4.5 in.; breadth 1.25 to 2 in.; petiole 4 to 5 in. Panicles axillary and terminal, half as long as the leaves, the terminal sometimes as long, broad, the branches few and spreading horizontally, compressed especially at the nodes. Flowers 3 in. long (including the stamens), green, sessile, the buds clavate; calyx 2 in long, campanulate above, abruptly narrowed

for half its length into a minutely granular pseudo-stalk; the mouth with 4 large, rounded lobes. *Petals* not calyptrate, three times as long as the calyx-lobes, ovate-round and like the latter reflexed in flower. *Fruit* unknown.

SINGAPORE: (in the "garden jungle"), Ridley 3706, 6416, 6419, 5728, 6233. Penang: Curtis 3010.

Notable for its green flowers.

EUGENIA PYRIFOLIA, Duthie in Hook. fil. Fl. Br. Ind. II, 487. A tree 20 to 40 feet high; young branches thicker than a crow-quill, pale, terete (the very youngest 4-angled), brownish-white. coriaceous, elliptic-oblong or oblong-lanceolate, occasionally obovateelliptic, shortly and rather bluntly cuspidate, or cordate-acuminate, the buse cuneate; upper surface (when dry) dark olivaceous-brown, shining, the main and secondary nerves and also the midrib depressed, the latter prominent, the former faint; lower surface paler and duller than the upper and the nerves and reticulations rather more prominent, the midrib bold and convex, the former faint; lower surface paler and duller than the upper; length 2.5 to 4 in.; breadth 1 to 1.75 in.; petiole ·25 to ·35 in. Panicles axillary and terminal, shorter or longer than the leaves, laxly branched, corymbose or pyramidal, many-flowered, the branches spreading, slender, acutely 4-angled, bracteoles at the bases of the branches and at the bases of the flowers minute, subulate, deciduous. Flowers white, '4 in. long (including the calyx), clavate in bud, sessile in groups of two, three or more at the ends of the branchlets; calux slightly over '2 in. in length, funnel-shaped, vertically striate, the mouth with 4 broad, shallow, rounded teeth. Petals reniform-orbicular or orbicular, dotted outside, free. Fruit depressed. globular, crowned by the narrow tubular remains of the calyx, not pulpy, 75 in. in diam. when ripe. E. tumida, Duthie l.c. 487. Syzygium pyrifolium, Wall. Cat. 3584; DC. Prodr. III, 261 (Syzyg.); Korth. in Ned. Kruidk I, 204; Mig. Fl. Ind. Bat. I, Pt. 1, 457. Calyptranthes pyrisolia, Blume Bijdr. 1099.

In all the provinces except the Andaman and Nicobar Islands:

37. EUGENIA LINEATA, Duthie in Hook. fil. Fl. Br. Ind. II, 487. A tree 30 to 60 feet high; young branches thicker than a crow-quill, terete, their bark pale brown. Leaves thinly coriaceous, ovate-lanceolate or narrowly elliptic, rather abruptly and shortly acuminate, the base cuneate; upper surface (when dry) olivaceous-brown, shining, sometimes minutely pitted; the nerves numerous, indistinct, the midrib depressed; lower pale-brown, not olivaceous, the main-nerves more distinct than on the upper, close together, the neighbouring ones

connected throughout their whole length by curving loops; length 2.75 to .4 in.; breadth 1.1 to 1.75 in.; petioles .25 to .35 in. Panicles terminal and from the upper leaf-axils, shortly pedunculate, lax, longer than the leaves; branches numerous divaricate, 4-angled, the younger also compressed. Flowers .4 or .5 in. long (including the stamens), sessile in twos or threes at the apices of the branchlets, the buds clavate. Calyx narrowly funnel-shaped, gradually tapering to the base, striate; the mouth with 4 rather deep, broad, rounded, concave lobes. Petals 4, orbicular, reflexed. Fruit ovoid, crowned by the thick, short, wide, 4-toothed calyx, black and shining when ripe, one-seeded, not pulpy, .3 in. long and .2 in. in diam. E. corymbosa, Wall. Cat. 3566 F. Jambosa lineata, DC. Prod. III, 287; Miq. Fl. Ind. Bat. I, Pt. 1, 428. Clavimyrtus lineatus, Blume Mus. Bot. I, 116. Myrtus lineata, Blume Bijdr. 1087.

In all the provinces except the Nicobar and Andaman Islands: common. Distrib.—The Malayan Archipelago.

A widely distributed species and varying as to size of leaf and also of flower-bud. In some specimens some of the nerves are of a dark colour on the lower surface. This is often confused with *E. rubricunlis*, Miq., which is itself a somewhat doubtful species.

38. Eugenia Cymosa, Lamk. Dict. III, 109 (not of Roxb.). A shrub or small tree; young branches as thick as a crow-quill, terete, pale. Leaves thinly coriaceous, ovate, ovate-lanceolate, (narrowly oblonglanceolate in VAR. concinna), caudate-acuminate, the base cuneate; both surfaces when dry brown, the upper tinged with olivaceous, the numerous nerves and reticulations distinct on the lower less so on the upper; length 2 to 3 in.; breadth 1 to 1.5 in.; petiole 15 to 3 in. Panicles numerous, axillary and terminal, an inch or two in length, the terminal twice as long, lax, the branches few, spreading, slender, compressed, with 3 or 4 flowers at their apices. Flowers sessile, white, 35 in. long (including the stamens). Calyx campanulate, abruptly contracted into a pseudostalk, the mouth with 4 small triangular lobes. Petals 4, orbicular, free. Fruit almost globular, the size of a pea, blueish-black, pulpy, 1or 2-seeded, (if 2-seeded transversely oblong in shape). Wight Ill. II, 17; Ic. t. 555; Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 67; For. Fl. I, 486. Duthie in Hook. fil. Fl. Br. Ind. II, 482. Syz. caudatum, Wall. Cat. 3591. S. vimineum, Wall. Cat. 3533?. S. concinnum, Wall. Cat. 3582. S. nelitricurpum, T. & B. in. Nat. Tidsch. Ned. Ind. XXV. S. cymosum, DC. Prodr. III, 259; Korth. in Ned. Kruidk. Arch. I, 202?. E. nigrescens, Poir. Suppl. III, 123?. E. rhodomelea, Commers. in DC. Prodr. l.c. Jambosa tenuicuspis, Miq. Fl. Ind. Bat. I, 431. Myrtus cymosa, Spreng.; Blume Bijdr. 1086.

In all the provinces. DISTRIB.—Burma, Sylhet and Assam, Java. 530

VAR. concinna (sp. Wall.); leaves narrowly oblong-lanceolate, caudate-acuminate.

PERAK: King's Collector 10521. DISTRIB.—Burma, Wallich 3582.

39. EUGENIA CONGLOMERATA, Duthie in Hook. fil. Fl. Br. Ind. II. 497. A large tree; young branches thinner than a goose-quill, obscurely 4-angled, blackish-brown, smooth: the older terete, grey, striate. Leaves coriaceous, oblanceolate, sub-acute or blunt, much tapered to the base: upper surface (when dry) blackish-brown, shining; the lower liver-coloured, somewhat dull, minutely black-dotted; mainnerves 18 to 20 pairs, spreading, curved, faint, more distinct on the upper than on the under surface, the midrib stout on the lower surface, the edges slightly recurved; length 3 to 4.5 in.; breadth 8 to 1.75 in.; petiole 2 to 35 in. Inflorescences generally 2 or 3 together from small tubercles on the naked branches below the leaves, consisting usually of few-flowered capitala on short pedancles from '25 to '5 in. long, or of solitary flowers from the bases of the peduncles. Flowers small, sub-globular or campanulate, only about 'l or '15 in. long, sessile. Calyx widely campanulate; the limb with 4 rounded lobes. Petals 4, free. Fruit pisiform, smooth, crowned by the 4 calyx-lobes and also by the stamens, red, smooth.

MALACCA: Maingay (K.D.) 745. SINGAPORE: (near the Botanic Garden), Ridley 5073.

40. EUGENIA URCEOLATA, King. A tree, 30 to 60 feet high: young branches rather thinner than a goose-quill, 4-angled, with pale brownishvellow, striate bark. Leaves coriaceous, elliptic-oblong, elliptic, or obovate-elliptic, shortly and bluntly acuminate, the base cuneate; upper surface (when dry) dark-brown, shining, pellucid-dotted; the lower warm-brown, with black dots: main-nerves 12 to 18 pairs, curving upwards and interarching 'l in. or more from the edge; length 5 to 7 in.; breadth 2 to 3.25 in.; petioles 25 in. long. Flowers from small axillary tubercles, solitary, fasciculate or in small panicles, (often several from one axil), much shorter than the leaves and with a few (usually about 3) very short, slender, spreading, 4-angled branches powdered with ferrugineous scurf. Flowers about '35 in. across (including the stamens). Calyx an open, rotate cup on a short, thin stalk, the margin divided into 4 broad, sub-orbicular, blunt, spreading, concave lobes. Petals 4, orbicular, free, spreading. Fruit turbinate, about 5 in. in diam., crowned by the short calyx-limb. Jambosa urceolata, Korth in Ned. Kruidk. Arch. I, (1847), 202; Miq. Fl. Ind. Bat. I, Pt. 1, 418 (excluding all the synonyms).

Perak: Wray 2423, 2609, 2928, 3134, 3248; King's Collector 1908, 2317, 713, 3345, 4262, 6665, 6682, 6600, 10677, 10780. Selangor:

Ridley 7333. SINGAPORE: Ridley 256, 4975. MALACCA: Ridley. DISTRIB.—Sumatra.

The rotate 4-lobed calyx distinguishes this species.

41. Eugenia glauca, King n. sp. A tree, 40 to 50 feet high; young branches somewhat thicker than a crow-quill, terete; the bark pale brown and flaky. Leaves coriaceous, oblong- or ovate-lanceolate, often obovate-lanceolate, sub-acute or blunt and with a short blunt point; upper surface (when dry) olivaceous-brown and shining, the lower glaucous (not glaucous in var.); the numerous nerves and reticulations very distinct on both surfaces, edge slightly recurved, (not recurved in var.) the intramarginal nerve very close to it; length 2.25 to 4 in.; breadth 1 to 2 in.; petiole 25 to 3 in. Flowers few, sessile, 3 in. long (including the stamens) and as much wide, in racemes or small, few-branched, axillary or terminal panicles 3 or 4 inches long (often several together), with compressed, 4-angled rachises. Calyx-limb, a wide shallow cup with 4 broad, shallow, deciduous lobes, afterwards truncateerose, below narrowed into a thin pseudo-stalk. Petals 4, orbicular, clawed, free, reflexed. Fruit unknown.

PENANG: Curtis 1152, 2228. PERAK: Ridley 3086. MALACCA: Derry 1184.

Distinguished by its much reticulate leaves glaucous beneath and its few-flowered inflorescence.

VAR. pseudo-glauca, King; like the type but with thinner narrower and more acute leaves with no tendency to be obovate, not glaucous beneath and the edges not recurved.

PERAK: Ridley 3108, 8386. The Dindings; Curtis 3440.

42. EUGENIA SUBRUFA, King n. sp. A tree, 20 to 30 feet high: young branches half as thick as a goose-quill, terete, grey or pale-brown after the defoliation of the thin, flaky, brown bark. Leaves thickly coriaceous, narrowly elliptic or elliptic-ovate, shortly acuminate, the base cuneate; upper surface (when dry) pale olivaceous-brown slightly shining, the midrib, nerves and reticulations depressed; lower reddish, dull, the midrib and nerves prominent: main-nerves about 8 pairs, curving upwards, interarching at less than 1 in from the edge to form a somewhat faint intramarginal line, the edges recurved; length 3.5 to 5 in.; breadth 1.5 to 2 in.; petiole 3 to 4 in. Panicles terminal and axillarly, pedunculate, the few branches very short and crowded at the apex of the pedancle; both peduncle and branches 4-angled. Flowers 5 in long (including the stamens), sessile, in threes at the apices of the very short (1 in long) branches, clavate-obovoid in bud. Calyx campanulates, funnel-shaped, reduced for a third of its length to a

stout, wrinkled pseudo-stalk: the mouth undulate and with 4 broad shallow deciduous teeth. Fruit ovoid, smooth, crowned by the wide circular remains of the calyx, 4 in long (unripe) and 35 in in diam.

SINGAPORE: Ridley 4588. PENANG: Curtis 194.

van. robusta, King; leaves larger (3 5 to 5 5 long and 1 5 to 2 2 in. broad) than in the typical form, and young branches thicker. Panicles several, terminal, 2 to 2 5 in. long; the branches more numerous than in the type form and not crowded at the apex, the lower as much as 4 in. long.

PENANG: Curtis 194, 1448, 3275.

A very rare but distinct species readily recognised by its short panicles, comparatively large flowers, and by the boldness of the midrib and of the few nerves on the under surface of the leaves which when dry are of a conspicuous terra-cotta colour.

EUGENIA DUTHIEANA, King n. sp. A tree, 40 to 70 feet high young branches thicker than a crow-quill, the bark brown, rather rough. Leaves coriaceous, elliptic, ovate-elliptic or lanceolate-elliptic, shortly acuminate, the base cuneate; both surfaces brown when dry and rather dull, the lower slightly the paler; main-nerves 4 to 8 pairs, curved, ascending, interarching far from the edge (about '15 in.), impressed on the upper, faintly prominent on the lower surface; the secondary nerves almost as prominent as the main ones; the reticulations indistinct on the lower, invisible on the upper surface; length 3 to 5 in.; breadth 1.25 to 2.25 in.; petiole .15 to .2 in. Racemes slender, 1 to 2 inches long, slender, solitary, clustered, terminal or axillary, the rachis dark, 4-augled. Flowers few, sessile, clavate in bud, sometimes clustered at the apex of the rachis. Calyx 2 in long, funnel-shaped, half of it contracted into a pseudo-stalk, the mouth wide and with 4 broad, rounded teeth. Petals reflexed, orbicular, white. Fruit clavate when young, becoming almost globular when ripe, rugulose, crowned by the wide circular remains of the calyx, .75 in. long and .65 in. in diam.

Perak: King's Collector 3966, 4218, 6268; Scortechini. Malacca Derry 256. Penang: Curtis 653. Singapore: Ridley 3864, 4982, 8400.

A species resembling *E. minutiflora*, Miq., but with larger flowers and more numerously nerved leaves. It is named after Mr. J. F. Duthie, F.L.S., who elaborated the *Myrtaeex* for Hooker's Flora of British India.

44. EUGENIA POLYANTHA, Wight Ill. 17; Icones 543. A tall, slender tree; young branches rather thicker than a crow-quill, brown. Leaves thinly coriaceous, narrowly elliptic or lanceolate, sometimes oblong-oblanceolate, shortly and bluntly acuminate, the base cuneate: upper surface (when dry) dark-brown, shining, the nerves scarcely visible; lower paler brown, dull, with numerous minute black dots; main-nerves

8 to 10 pairs, spreading, slightly curved upwards at the ends and interarching less than 1 in. from the edge, slightly prominent on the lower surface: length 3 to 4.5 in.; breadth 1 to 1.5 in.; petiole 2 to 3 in. Panicles numerous, from the young branches below the leaves, or rarely axillary, 1 to 1.5 in. long; the rachis and short divaricate branches slender, compressed, 4-augled. Flowers at the ends of the branchlets. usually in threes, white, sessile. Petals 4, orbicular, free. Calyx a little more than '1 in. long, campanulate, constricted for one-third of its length into a pseudo-stalk, rugulose, shining: the mouth with 4 deep. rounded lobes. Fruit much depressed-globular if one-seeded, broader than long if two-seeded, always much depressed and crowned by the circular remains of the calyx, black, hard, without pulp, 15 in. long and of the same width if globular, and more than twice as broad if 2-seeded. Duthie in Hook. fil. Fl. Br. Ind. II, 496. E. nitida, Duthie l.c. E. Incidula, Miq. Fl. Ind. Bat. I, Pt. 1, 444. ? Myrtus cymosa, Bl. Bijdr. 1086.

In all the provinces, except the Nicobars and Andamans: common. Distrib.—Malay Archipelago, Burma.

45. Eugenia Manii, King n. sp. A tree, 20 to 30 feet high: young branches about as thick as a crow-quill, pale-brown, terete. Leaves membranous, elliptic to ovate-elliptic, the apex acuminate, the base cuneate; both surfaces brown when dry, the lower much paler than the upper and with numerous small black dots; main-nerves 5 or 6 pairs, curved, ascending, interarching 1 to 15 in. from the edge; reticulations large, indistinct on the lower and invisible on the upper surface; length 3.5 to 4.5 in.; breadth 1.5 to 2 in.; petiole 2 to 4 in. Panicles mostly shorter than the leaves, crowded, from the axils of leaves and of fallen leaves, usually shorter than the leaves, the branches few and slender (one often from the very base), compressed. Flowers clustered at the apices of the filiform branchlets, often numerous and crowded, sometimes few, whitish-red in colour, globular in bud. Calyx 15 in. long, campanulate, abruptly contracted into a short pseudo-stalk; the mouth with 4 deep, ovate-rotund lobes. Petals 4, rotund, slightly longer than the calyx-lobes, free, not calyptrate. Fruit depressed-globular, minutely rugulose, crowned by the small circular remains of the calyx, 4 in. broad and slightly less from base to apex.

Andaman Islands: King's Collectors.

Named in honour of Mr. E. H. Man, C.I.E., Deputy Commissioner of the Andamans, who has for years given most cordial help in the botanical exploration of the Andaman and Nicobar groups. A species related to E. polyantha, Wight, but with larger fewer-nerved leaves, and rather longer flowers and fruit. Also near E. operculata, Roxb.

46. Eugenia caudata, King. A glabrous bush or small tree; young branches very slender, sub-terete, the bark pale-grey or brown. Leaves thinly coriaceous, lanceolate or ovate-lanceolate, caudate-acuminate, the base cuneate; both surfaces pale-brown when dry, the lower palest; nerves numerous, spreading, scarcely visible; length 1.75 to 3 in.; breadth 75 to 1.1 in.; petiole 15 to 3 in. Racemes on slender ped uncles, axillary or terminal, shorter than the leaves, laxly 3- to 5-flowered. Flowers 25 in. across, on slender pedicels 1 to 2 in. long, (longer in fruit). Calyx 2 in. long, campanulate, contracted at the very base into a very short pseudo-stalk (less than a quarter of its length), the mouth with 4 short, broad, blunt, deciduous teeth. Petals orbicular, about twice as long as the short stamens, deciduous. Fruit at first ovoid, afterwards nearly globular, 5 in. long, smooth, crowned by the cupular, short, 4-toothed calyx-limb. Myrtus caudata, Wall. Cat. 3631.

SINGAPORE: Wallich. Penang: Curtis 654. Perak: Curtis 2007; Scortechini 392, 444; King's Collector 3654, 4241, 6262; Wray 472, 1176, 1574, 2824, 3208, 5341.

A species rather easily recognised by its small caudate-acuminate, lanceolate, indistinctly-nerved leaves and few-flowered, lax racemes Wallich also issued under his No. 3591 a plant to which he gave the name Syzygium caudatum. It differs much from this and is in fact Eugenia cymosa, Lamk.

EUGENIA FILIFORMIS, Wall. Cat 3578. A glabrous tree, 30 to 50 feet high, with slender drooping branches: young branches very slender, terete, dark-coloured. Leaves coriaceous, small, pellucid-dotted, lanceolate or ovate-lanceolate, shortly caudate-acuminate, the base cuneate: both surfaces greenish-brown when dry: the nerves numerous, a few slightly conspicuous, the others very faint; length 1.75 to 3 in.; breadth '75 to 1.2 in.; petiole 15 to 2 in slender. Racenes slender, very lax, few-flowered, axillary and terminal, as long as or longer than the leaves. Flowers .75 in. long including the stamens, inserted on the slender rachis by filiform pedicels .75 to 1.25 in. in length. Calyx funnel-shaped, attenuated for half its length into a slender pseudostalk; the limb with 4 broad, blunt, reflexed lobes nearly 1 in long. Petals orbicular-reniform, reflexed, 25 in. long. Ripe fruit ellipticovoid to sub-globular, smooth, '75 in. long, crowned by the calyx-lobes. Duthie in Hook. fil. Fl. Br. Ind. II. 478. Syzygium filiforme and S. capillare, Wall. Cat. 3580 and 3578. Clavimyrtus virens, Blume Mus. Bot. Lugd. Bat. I, 114.

SINGAPORE: Wallich; Hullett; Ridley 4569. PENANG: Wallich; Curtis 1090, 1443. Malacca: Griffith (K.D.) 2389; Maingay (K.D.) 721; Derry 451, 471. PERAK: King's Collector 2321, 5601, 5861, 5925, 6708; Wray 1192, 3262; Ridley 9640.

48. Eugenia and and anica, King n. sp. A small glabrous tree: young branches slender, with greyish-brown rather rough bark. Leaves coriaceous, rotund-ovate to rotund, with a very short abrupt blunt apiculus, obscurely crenate near the apex, abruptly tapered to the base; nerves numerous invisible on the upper shining surface and faint on the dull lower surface, curving upward, interarching close to the margin; length 1.5 to 2.5 in.; breadth 1 to 2 in.; petiole 3 or 4 in. Panicles often as long as the leaves, crowded, pedunculate, axillary and terminal, the branchlets usually trichotomous, 4-angled, bearing 3 or 4 sessile flowers at their apices. Flowers about 5 in. long, clavate, the calyx contracted into a pseudo-stalk more than half of its length, the mouth with 4 erect, equal, triangular, acute teeth. Petals 4, orbicular, calyptrate. Fruit unknown.

ANDAMAN ISLANDS: King's Collector.

49. Eugenia Hoseana, King n. sp. A glabrous tree, 30 to 40 feet high: young branches thinner than a goose-quill, pale greyish-yellow, terete, the very youngest quadrangular. Leaves coriaceous, elliptic to elliptic-oblong, abruptly and shortly candate-acuminate, the base cuneate; upper surface dark-brown leaden and shining when dry, the lower pale-brown and dull; main-nerves 15 to 20 pairs ascending very little, almost straight, interarching 1 in. from the edge; length 45 to 7 in.; breadth 1.75 to 2.5 in.; petiole 15 to 3 in. Racemes axillary and terminal, solitary, not more than 1 in. long, the rachis with 2 deep grooves. Flowers white, 35 in. long, exclusive of the stamens, sessile, enveloped in several sub-ovate leathery bracts as long as themselves. Calyx-tube widely campanulate, contracted slightly at the base but not into a pseudo-stalk; its texture very leathery; its mouth with 4 blunt, obtuse lobes. Petals orbicular. Fruit unknown.

Perak: Scortechini 163; Wray 2952; King's Collector 3407.

50. Eugenia Benjamina, King n. sp. A glabrous shrub or small tree: young branches thin, terete, pale-brown. Leaves thinly coriaceous, conspicuously pellucid-dotted on both surfaces, narrowly elliptic, sometimes oblanceolate-elliptic, with an abrupt, narrow, short apiculus half an inch or more in length, the base cuneate: both surfaces pale yellowishor greenish-brown when dry; the nerves very numerous, distinct like the reticulations, interarching near the margin; length 2.5 to 3 in.; breadth 1 to 1.5 in.; petiole 15 in. slender. Racemes axillary or terminal, shorter than the leaves, few-flowered. Flowers 5 to 6 in. long, (including the stamens), sessile on short stout pedicels. Calyx clavate, the mouth with 4 broad, blunt lobes. Petals orbicular, with thin edges. Fruit when young covered with large convex pellucid glands, crowned by the deeply 4-lobed calyx-limb; when ripe depressed-globular, the calyx-limb reduced to a ring, 1 in. long and 1 to 1.4 in. broad.

Perak: Wray 2623, 2797, 3204; King's Collector 7306. DISTRIB.—Sumatra, Forbes 2046.

Named from the resemblance of its leaves to those of *Ficus Benjamina*, Linn. The Perak specimens have no ripe fruit on them and the description of it above given is taken from Forbes's Sumatra specimens which agree in leaf absolutely with those collected in Perak.

EUGENIA VARIOLOSA, King n. sp. A glabrous shrub, 12 to 20 feet high: young branches slender, 4-angled, pale-brown, profusely dotted, like the leaves on both surfaces and the flowers, with large pellucid glands. Leaves thinly coriaceous, oblong-lanceolate, rarely elliptic-oblong, caudate-acuminate, the base cuneate; both surfaces when dry pale-brown; main-nerves 12 to 15 pairs slightly prominent on the lower surface (when dry), ascending, rather straight, interarching ·1 to ·15 in. from the margin, secondary nerves and reticulations indistinct: length 5.5 to 7 in.; breadth 1.35 to 2.5 in.; petiole 2 to 3 in. Racemes axillary and terminal, crowded, only about 1 in. long. Flowers white, 4 in. across, on stout pedicels less than 1 in. long. Calyx-tube narrowly campanulate, 2 in. long, the mouth with two very unequal pairs of rounded teeth. Petals orbicular, thick in the centre, much shorter than the stamens. Style about 5 in. long. Fruit globular: smooth, prominently glandular-dotted, crowned by the short calyx, 8 in. in diam.

Perak: Scortechini; King's Collector 3415, 3995, 6036, 10437. Singapore: Ridley 8411, 8449. Selangor: Ridley 4973.

Distinguished by having prominent pustule-like glands on all its parts.

52. EUGENIA CLAVIFLORA, Roxb. Hort. Beng. 37; Fl. Br. Ind. II, 488. A glabrous tree, 25 to 30 feet high: young branches slender, palebrown, compressed. Leaves thinly coriaceous, lanceolate or oblonglanceolate, shortly acuminate, the base acute; main and secondary nerves very numerous, curving upwards and interarching less than 'l in. from the edge: length 4 to 6 in.; breadth 1.5 to 2 in.; petiole 1 to 15 in. Flowers 6 to 8 in. long, in very shortly stalked, condensed, axillary corymbs, sessile; the calyx-tube narrowly cylindric-clavate, contracted at the base into a slender pseudo-stalk; the mouth with 4 or 5 short, broad lobes. Petals 4 or 5, free, white, orbicular-ovate, about 25 in. long; filaments about '6 in. long. Fruit narrowly oblong-ovoid, about ·8 in. long, smooth, pulpy, crowned by the short, incurved calyx-limb, 1-seeded. Duthie in Hook. fil. Fl. Br. Ind. II, 484; Wight Ill., II, 15; Ic. t. 606; Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2. 65; For. Fl. I, 480. Syzygium claviflorum, Wall. Cat. 3575. S. longiflorum, Wall. Cat. 3572. S. excavatum, Wall. Cat. 3574. Wall. Cat. Indeterminata 8085.

NICOBAR and Andaman Islands; common. DISTRIB.—British India

in Burma, Chittagong and Assam.

var. leptantha; flowers and fruit smaller than in the typical form: flowers in short racemes, not in corymbs: fruit 4 in. long. Duthie in Hook. fil. Fl. Br. Ind. II, 484; Benth. Fl. Austral. III, 283 (Syz.); Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 65; For. Fl. I, 480. S. suavissimum, Wall. Cat. 3573. Syzyg. Griff. Notul. 654.

Malacca: Griffith (K.D.) 2366/1, 2367. Penand: Ridley 1021, 1109. var. excavata; leaves more coriaceous than in the typical form and somewhat larger, young branches with rather rough bark. Syzygium excavatum, Wall. Cat. 3574.

PENANG: Curtis 697, 749, 8384, 8393. PROV. WELLESLEY: Ridley

6970. PERAK: King's Collector 7440. JOHORE: Ridley 4076.

VAR. Maingayi; young branches rather stout, the very youngest smooth, the older with deeply striate bark. Leaves thickly coriaceous, oblong-lanceolate, shortly acuminate, main-nerves not prominent, the midrib very prominent on the lower surface: length 4.5 to 7.5 in. Flowers about 5 in. long: fruit unknown. E. Maingayi, Duthie in Hook. fil. Fl. Br. Ind. II, 484.

Malacca: Maingayi (K.D.) 750.

This is known only from Maingay's imperfect specimens. It does not appear to me to be separable specifically from E. claviflora, Roxb.

VAR. glandulosa; young branches acutely 4-angled: leaves as in VAR. Maingayi: calyx-tube with large pellucid glands.

MALACCA: Mount Ophir; only once collected.

53. EUGENIA ZEYLANICA, Wight Ill. II, 15: Ic. I, 73. A glabrous tree, 30 to 60 feet high: young branches slender, obsoletely 4-angled or terete, pale-brown. Leaves coriaceous, lanceolate, sometimes ovatelanceolate, obtusely acuminate, the base acute: both surfaces shining, brown when dry, the lower minutely glandular and paler: nerves 10 or 12 pairs, indistinct, interarching near the edge, the reticulations obsolete; length 1.5 to 3.5 in.; breadth .35 to 1.5 in.; petiole .05 to .15 in. Panicles axillary and terminal, crowded, the axillary shorter than the leaves, the terminal longer; branchlets short, 4-angled like the main-rachis. Flowers numerous, in twos or threes at the apices of the ultimate branchlets, their length (including the stamens) 35 to 4 in. Calyx funnel-shaped, 2 in. long, sessile or on a short pedicel; the tube ribbed, granular-tubercled; the limb with 4 or 5 ovate-rotund, concave, erect, deciduous lobes. Petals orbicular, 4 or 5, deciduous as a calyptra. Fruit pisiform, smooth, white. Duthie in Hook. fil. Fl. Br. Ind. II, 485. Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 65; For. Fl. I, 481. E. spicata, Lam. Dict. III, 201; DC. l.c. (Syz.). Trimen Fl. Ceylon I, 171. Bedd. Fl. Sylv. I, t. 202. E. glandulifera, Roxb. Hort. Beng. 37; Fl. Ind. II, 496. S. zeylanicum, DC. Prodr. III, 260; Wall. Cat. 3564, in part; Z. corticata, Wall. Cat. 3565; Dalz. and Gibs. Bomb. Fl. 94. Acmena zeylanica, Thwaites Enum. 118. A. parviflora, DC. lc. 262. Jambosa bracteata, Miq. Fl. Ind. Bat. I, Pt. 1, 437. S. corticatum, Wall. Cat. 3565. Myrtus zeylanica, Linn. Sp. Pl. 675.—Rheede Hort. Mal. v. t. 20.

In all the provinces; common. DISTRIB.—British India, Ceylon.

54. Eugenia grata, Wight Ill. II, 15. A small glabrous tree: young branches sub-terete, the bark pale-brown, loose. Leaves coriaceous, ovate-lanceolate to lanceolate, acuminate, the base acute; upper surface brown when dry, the lower pale, main-nerves numerous, curving, ascending, interarching about 1 in. from the edge, distinct as is the midrib on the lower surface in the young leaves, indistinct on the upper: length 2 to 3.5 in.; breadth 85 to 1.5 in.; petiole 15 to 25 in. Inflorescence and flowers as in E. zeylanica but the calyx-tube not granular. Fruit ovoid, pellucid-dotted, crowned by the small calyx-lobes, 2 in. long, black when ripe. Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, p. 65; For. Flora Burma I, 480; Duthie in Hook. fil. Fl. Br. Ind. 486. Syzyg. gratum, Wall. Cat. 3586. S. scabridum, Wall. Cat. 3564 D. Myrtus quadrangularis, Ham.

MALACCA: Griffith (K.D.) 2364. PENANG: Curtis 317, 756, 2245; Wallich. PERAK: Ridley 7955, 9456; King's Collector 5414, 5433, 6267. Andaman Islands: King's Collector. Distrib.—Sumatra.

A species very close to *E. zeylanica* but with somewhat larger leaves, glaucous or sub-glaucous beneath. The best distinguishing marks lie however in the calyxtube which in this is smooth, and in the fruit which in this is ovoid and black.

55. Eugenia tecta, King n. sp. A glabrous tree, 20 to 25 feet high: young branches slender, 4-angled; the bark dark-brown, flakey. Leaves thinly coriaceous, almost sessile, ovate-lanceolate, shortly and obtusely acuminate, the base rounded and minutely cordate; both surfaces pale-brown when dry; nerves numerous but scarcely visible, the midrib prominent on the lower surface and bearing small scattered tubercles; length 2.5 to 3.25 in.; breadth 1.1 to 1.6 in.; petiole 05 to 1 in., densely covered with black tubercles. Flowers 5 or 6 in. long (including the stamens), crowded in axillary or terminal fasciles, sessile. Calya widely funnel-shaped, tapered to the bracteolate base, minutely dotted; the limb wide, with 5 broad lobes. Petals orbicular, yellowish, deciduous. Fruit unknown.

PERAK: King's Collector 1863.

56. EUGENIA PSEUDO-TETRAPTERA, King n. sp. A tree? Young branches of the thickness of a crow-quill, compressed at the nodes,

4-angled and 4-winged, the bark dark-brown and flakey, deciduous. Leaves thinly coriaceous, almost sessile, broadly lanceolate or ovatelanceolate, the base broad and minutely cordate, the apex shortly and bluntly acuminate; upper surface dull olivaceous-brown with remote black pits, the nerves slightly and the midrib greatly depressed; lower surface pale-brown, with many small black marks especially on the bold thick midrib; main-nerves 14 to 18 pairs, prominent, slightly curved, subascending and interarching at about 1 in. from the edge; length 2 to 2.25 in.; breadth 1 to 1.5 in.; petiole .05 in. wrinkled. Flowers in terminal, sessile, multi-bracteate glomeruli about 4 in. long; the bracts about as long as the flowers, large, broadly oblong, blunt, their posterior surfaces bearing many black dots. Flowers about '25 in. long, their pedicels less than 1 in. Calyx cylindric, slightly contracted at the base; the mouth with 5 erect, ovate, blunt, sub-distant teeth, about 05 in. long. Petals sub-orbicular, calyptrate. Fruit subglobular, 25 in. in diam., crowned by the calvx-teeth.

JOHORE: on Gunong Panti, Ridley 4197.

This species comes very near *E. tetraptera*, Miq., but that species has narrower, less conspicuously bracteate flowers and its young branches are covered with glandular hairs. This is also allied to *E. tecta*, King, which has, however, larger flowers in pedunculate bracteate heads. The leaves of the two are almost exactly alike in texture and form, but the dots and pits in those of *E. tecta* are less conspicuous than in these of this plant. This is also closely allied to *E. polita*.

57. EUGENIA POLITA, King. A glabrous tree, 30 to 60 feet high; young branches slender, compressed and acutely 4-angled or winged, their bark pale-brown and deciduous. Leaves coriaceous, lanceolate or ovate-lanceolate, bluntly and shortly acuminate, the base abruptly cuneate, both surfaces shining and of a liver-brown colour; main-nerves 10 to 12 pairs, often forked, interarching less than '04 in. from the edge, hardly visible on the upper surface, length 1.5 to 2.25 in.; breadth ·75 to 1 in.; petiole under ·1 in. Panicles shorter than the leaves, axillary and terminal, very condensed, many-flowered, bearing coriaceous bracts of two sorts, those at the base of the panicle with long, subulate points, those at the base of its branches and of the flowers oblong with broad truncate apices, the rachis and branches 4-winged. Flowers (including the stamens) 35 in. long, sessile. Calyx funnel-shaped, ribbed, very coriaceous; the limb much prolonged beyond the ovary, but only slightly expanded, with 5 ovate-rotund, concave, erect lobes. Petals orbicular, deciduous. Stamens not very numerous nor long. Fruit globular, crowned by the 5 calyx-lobes, when young minutely pellucid-glandular. E. zeylanica, Duthie (not of Wight) in Hook. fil. Fl. Br. Ind. II, 485, in part. Syzyg. politum, Wall. Cat. 3626.

Penang: Porter; Curtis 511. Johore: Ridley 4078. Perak: Scortechini 585; Wray 2822; King's Collector 6930, 8679. Malacca: Ridley 859.

A species superficially resembling E. zeylanica, Wight, but really differing greatly from that and every other species within our region by its prominently bractate and very condensed inflorescence which has winged branchlets. The fruit has been only twice collected.

58. EUGENIA VALDEVENOSA, Duthie in Hook, fil. Fl. Br. Ind. II. 489. A glabrous tree, 20 to 50 feet high: young branches rather thinner than a goose-quill when dry, acutely 4-angled but not winged, the bark brown. Leaves coriaceous, elliptic, shortly and abruptly acuminate, the base cuneate or rounded; upper surface olivaceous-brown, reticulate, the nerves faint: lower warm-brown, the main-nerves 14 to 24 pairs, very prominent, curving upwards and interarching in a wavv line 15 to 25 in, from the edge; length 5.5 to 8 in.; breadth 2.35 to 3.5 in.; petiole 2 to 25 in. Panicles terminal or from the upper leafaxils, pedunculate, rather shorter than the leaves, with many spreading, lax branches, the branchlets compressed. Flowers white, sessile, in heads on the ends of the branchlets. 4 in, long (including the stamens). the buds narrowly clavate. Calux narrowly infundibuliform, tapering equally from base to apex, the mouth truncate, entire. Petals calyptrate. Fruit depressed-globular, crowned by the short remains of the calyxtube, smooth, 75 in. in diam. L. ellipticum, Wall. Cat. 3587 in part, (not of other authors).

Penang: Wallich; Curtis 55; King's Collector 1579; Maingay 723, 762. Perak: Scortechini 1662; Wray 2209, 2842; King's Collector 737, 2737, 4947, 5122, 5322, 7003, 10246, 10873.

Under the pre-occupied name *L. ellipticum*, Wallich issued this species as No. 3587 of his Catalogue. Mixed with it, however, he issued some leaves of a distinct species from Penang. Good specimens, with leaves exactly agreeing with these, have since been found and that plant has been named *E. pergamacea*, King.

59. EUGENIA OBLONGIFOLIA, Duthie in Hook. fil. Fl. Br. Ind. II, 491. A tree; young branches somewhat thicker than a crow-quill, very pale, 4-angled (sometimes obscurely so). Leaves thinly coriaceous, elliptic or oblong-elliptic, shortly acuminate, the base cuneate; both surfaces shining, the nerves and reticulations distinct; upper surface pale-olivaceous, the lower pale-brown; main-nerves 10 to 16, slender, whitish, not much more prominent than the secondary, interarching less than 'I in from the edge; length 3 to 4.5 in.; breadth 1.25 to 2 in.; petiole '3 in long. Panicles terminal, corymbose, spreading, many-flowered, 3 or 4 inches in length and as many in breadth; the short peduncle and numerous branches stout, 4-angled, the branchlets

compressed, all very pale. Flowers 3 or 4 in across. Petals 4, calyptrate, green. Calyx 2 in long, campanulate, contracted for half its length into a thin pseudo-stalk, smooth; the mouth truncate or very slightly toothed. Fruit (unripe) globular, smooth, crowned by the short, wide remains of the calyx, 35 in. in diam.

Malacca: Maingay (K.D.) 746. SINGAPORE: Ridley 360, 4993, 10131. Perak: King's Collector 6012, 8848, 10883.

VAR. parviflora; flowers smaller than in the typical form: leaves oblong-lanceolate, tapering to each end, 3.5 to 5.5 in. long and 1 to 1.5 in. broad.

PERAK: Scortechini 618.

VAR. robusta, King; calyx 35 in. long; panicles, branches of panicle and young twigs thicker than in the typical form.

PERAK: Scortechini 216.

60. EUGENIA SUBHORIZONTALIS, King n. sp. A small tree; young branches thinner than a goose-quill, terete, blackish-brown when dry. Leaves thinly coriaceous, oblong or elliptic-oblong, tapering to each end, shortly and sharply acuminate, the base cuneate, the edges somewhat recurved (when dry), the upper surface dark olivaceous-brown and shining, the midrib depressed, all the nerves faint, lower surface dark brown, not olivaceous, duller than the upper, the midrib very bold and convex, the main-nerves 15 to 20 pairs, sub-horizontal, thin, but rather prominent and shining, interarching to form a bold intramarginal line ·1 in. from the edge, the secondary nerves and reticulations rather distinct; length 4.5 to 7 in.; breadth 1.5 to 2.3 in.; petiole 5 to 6 in. Panicles axillary and terminal, the former shorter than the leaves, the latter often longer, lax: the branches rather sparse, spreading, compressed, obscurely 4-angled. Flowers white, sessile, in clusters of 3 to 6 at the ends of the branchlets, globose-clavate in bud. Calya 25 in. long, funnel-shaped, contracted to a pseudo-stalk for half its length: the limb with 4 shallow, broad, rounded (sometimes acute) lobes. Fruit unknown.

PERAK: Wray 2118, 2097. DISTRIB.—Sumatra, Hort. Bogor. 3350 under the name of E. punctulata, Miq., which it is not.

61. Eugenia Valetoniana, n. sp. King. A tree, 60 to 80 feet high; young branches thicker than a crow-quill, terete, the bark pale-brown, flakey. Leaves as in E. Griffithii but somewhat narrower and with rather more numerous main-nerves. Flowers sessile in small terminal or axillary panicles shorter than the leaves, with very few short, terete, few-flowered cymose branches, or in small pedunculate cymes. Calya 3 in. long, clavate-campanulate, constricted into a short pseudo-stalk; the wide mouth truncate or with 4 deciduous, short, rounded lobes.

Petals small, orbicular, deciduous. Fruit when unripe pyriform, when ripe globular, crowned by the wide calyx-limb, 5 in. long.

PERAK: King's Collector 5982, 6090.

A species near E. Griffithii, and also near E. Clarkeana and E. Koordersiana, but with much smaller panicles and fruit at first pyriform.

EUGENIA EXPANSA, Duthie in Hook. fil. Fl. Br. Ind. II, 491. A tree, 20 to 50 feet high; young branches thinner than a goose-quill, terete, pale-brown. Leaves coriaceous, oblong-lanceolate or oblongelliptic, acuminate, the base cuneate, both surfaces brown (when dry) and shining, the lower paler; main-nerves 20 to 24 pairs, faint, spreading, connected by numerous loops, not very prominent in either surface but distinctest on the lower, intramarginal line less than 'l in. from the edges: length 4 to 6 6 in.; breadth 1 to 2 25 in.; petiole 15 to 2 in. Panicles numerous, terminal and axillary, usually 2 or 3 together. varying in length from less than one inch to several inches, the longer ones bearing a few slightly compressed branches with 5 to 8 sessile flowers crowded at their apices. Flowers (including the stamens) 3 in. long (sometimes longer), clavate in bud. Calya 15 in. long, infundibuliform, minutely rugulose; the mouth truncate, undulate, slightly reflexed. Petals orbicular, calyptrate. Fruit unknown. Syzygium expansum, Wall. Cat. 3567. S. euneuron, Miq. Fl. Ind. Bat. Suppl. 314.

Penang: Wallich 3567; Curtis 247. Perak: Wray, Scortechini, King's Collector; very common.

63. Eugenia chloroleuca, King. A small tree or shrub; young branches almost as thin as a crow-quill, terete below but 4-angled near the apex, yellowish. Leaves coriaceous, oblanceolate, shortly and bluntly acuminate, much narrowed at the base; both surfaces pale-olivaceous; the upper tinged with brown, shining, the main-nerves indistinct or invisible; the lower very pale, dull, the 12 to 16 main-nerves spreading, very faint, the edge thickened and slightly recurved; length 3 to 5.5 in.; breadth 1 to 2.25 in.; petiole 3 to 35 in. Panicles much shorter than the leaves, mostly terminal, rarely axillary, trichotomous, the branchlets also trichotomous, all acutely 4-angled and striate, the bracteoles at the nodes and at the bases of the flowers short, concave, ovate. Flowers bibracteolate at the base, in threes, 4 in. long (including the stamens) on 4-angled pedicels 1 in. long. Calyx 15 in. long, minutely rugulose; the mouth with 4 broad, shallow teeth. Fruit ellipsoid, rugulose, crowned by the 4 persistent calyx-teeth, length (unripe) 3 in.

Perak: King's Collector 1901, 4951, 7307; Scortechini 45; Wray 2917.

This closely resembles Eugenia fastigiata (Calyptranthes fastigiata, Blume), but the leaves have shorter petioles and fewer nerves and the fruit of this is corrugated rugulose and not glandular. This also resembles Eugenia sylvestris (Caryophyllus sylvestris, Blume) almost exactly in leaves: but the fruit of the latter is very different.

64. Eugenia nigricans, King n. sp. A large tree; young branches rather thicker than a crow-quill, sub-terete, dark-brown when dry. Leaves oblong to oblong-elliptic, shortly and abruptly acuminate, the base more or less cuneate; both surfaces very dark-olivaceous and dull (when dry), the lower with a reddish tinge: nerves very numerous and close together, straight and sub-horizontal, all faint below and distinct above, the reticulations few and faint on both surfaces, the edge recurved, and the intramarginal line very near it; length 2.5 to 4 in.; breadth 1.4 to 2 in.; petiole 3 to 4 in. Panicles axillary and terminal, not more than half as long as the leaves with few lax trichotomous spreading branchlets, all 4-angled. Flowers white, 3 in. long (including the stamens), in threes, sessile, clavate in bud. Calyx 15 in. long, wrinkled, funnel-shaped, narrowed for half its length into a pseudo-stalk, the mouth wide and truncate. Petals deciduous. Fruit unknown.

PERAK: Wray 2221.

EUGENIA INOPHYLLA, Roxb. Hort. Beng. 37: Fl. Ind. II, 496. A glabrous tree, 40 to 60 feet high; young branches rather thinner than a goose-quill, terete, dark-brown. Leaves coriaceous, narrowly elliptic or elliptic-lanceolate, rather abruptly acuminate, the base cuneate; both surfaces when dry smooth, shining, the numerous thin, curved, ascending main-nerves indistinct; the upper surface almost black, the lower deep-brown; length 3 to 5 in.; breadth 1.25 to 2.25 in.; petiole ·2 to ·4 in. Panicles corymbose, in the upper leaf-axils and terminal, nearly as long as or longer than the leaves, on rather long peduncles, many-flowered, each from 2.5 to 3 in. across, the branches and branchlets numerous, 4-angled. Flowers 2 or 3 together, sessile at the apices of the branches, '4 in. long (including the coloured stamens) white, clavate in bud. Calyx funnel-shaped, rather abruptly tapered to the base, 2 in. long, smooth; the mouth truncate, with 5 very obscure, short, broad teeth. Petals calyptrate. Fruit (according to Roxburgh) pear-shaped, large. Duthie in Hook. fil. Fl. Br. Ind. II, 481 in part. Wight Ic. 623 (bad). Jambosa inophylla, Miq. Fl. Ind. Bat. I, Pt. 1, 433. Syzygium inophyllum, Wall. Cat. 3600 in part; DC. Prodr. III, 260.

Perak: Wray 1377, 2554, 2655, 2734; King's Collector 4741, 6079, 655, 8481. Penang: Curtis 973, 974, 2621.

Two specimens of this are included in the Linnæan Society's set of the Wallichian plants under 3600. The other two sheets belong to two different species.

66. EUGENIA OBLATA, Roxb. Hort. Beng. 37; Fl. Ind. II, 493. 544

A tree, 40 to 50 feet high; young branches terete (when dry), reddishbrown. Leaves thinly coriaceous, oblong to elliptic-oblong, or broadly lanceolate, acuminate, the base cuneate; both surfaces brown (when dry), shining, the upper often tinged with olivaceous and the lower with red, main-nerves 20 to 24 pairs, close, connected by numerous secondary nerves and reticulations, indistinct on the upper but distinct on the lower surface, intramarginal nerve very close to the slightly recurved margin; length 3.5 to 5 in.; breadth 1 to 2.5 in.; petiole 2 to 25 in. Panicles axillary and terminal, shorter than the leaves, often pedunculate, corymbose, the branches and branchlets few, crowded, obtusely 4-angled. Flowers 5 in. long, including the stamens, white, sessile, shortly clavate in bud. Calyx '25 in. long, funnel-shaped, the mouth with 4 deciduous, short, blunt lobes, narrowed to a pseudo-stalk. Petals orbicular, calyptrate. Fruit as large as a cherry when ripe, smooth, pulpy, the pericarp rather thick; seed solitary. Wight Ill. II, 15; Ic. t. 622; Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 67; For. Fl. I, 488; Duthie in Hook. fil. Fl. Br. Ind. II, 492. S. oblatum, Wall. Cat. 3569. S. pulchellum, Wall. Cat. 3566 in part. Syzg. truncatum, Mig. Fl. Ind. Bat. I, Pt. 1, 455. Jambosa pulchella, Miq. Fl. Ind. Bat. I, Pt. 1, 422. E. comosa, Wall. Cat. 3566 D; l.c. 3600 C (under E. inophylla).

MALACCA: Derry 1178. PERAK: Scortechini. PROVINCE WELLESLEY: Curtis 9378a. PENANG: Ridley 9378.

67. Eugenia Bernardi, King n. sp. A medium-sized tree; young branches thicker than a crow-quill, slightly compressed, dark-brown, the older terete and grey. Leaves thinly coriaceous, broadly elliptic, abruptly and shortly acuminate, the base slightly cuneate; both surfaces brown (when dry) and shining, the lower slightly paler; the numerous close nerves and their connecting reticulations distinct on both; the intramarginal line less than 'I in, from the edge, the midrib depressed on the upper, prominent on the lower surface; length 3.5 to 4.5 in.; breadth 1.75 to 2.25 in.; petiole .25 to .4 in. Panicles terminal, occasionally from the branches below the leaves, shorter than the leaves. when in flower but longer in fruit, densely corymbose, trichotomously branched, many-flowered, the peduncle and lower branches terete, the branchlets 4-angled. Flowers partly sessile and partly on very short thick pedicels, the buds obovoid, obtuse. Calyx 15 in. long, campanulate-cylindric, tapering slightly to the base but not forming a pseudostalk, smooth, the limb truncate. Petals falling off in a depressed calyptra. Stamens '25 in. long. Fruit turbinate, black when ripe, without pulp, crowned by the minute remains of the calyx, 2 in. in diam.

Perak: Scortechini 326. Selangor: Ridley 8617. Penang: Curtis 975, 2845.

Remarkable for its short, obovoid flower-buds; closely related to E. simulans which has, however longer clavate buds.

EUGENIA PRAINIANA, King n. sp. A tree 60 to 80 feet high; young branches as thick as a goose-quill, terete, brown. Leaves thickly coriaceous, elliptic-oblong, the apex shortly acuminate, the base cuneate; upper surface dark-brown, shining, the midrib pale and depressed, the nerves slightly raised, faint; lower surface yellowishbrown, dull, the 20 to 30 pairs of main nerves and the intramarginal one slightly raised but indistinct, edges slightly recurved; length 3.5 to 5 in.; breadth 1.5 to 1.75 in.; petiole about .5 in. Panicles mostly terminal, but a few of smaller size from the upper leaf-axils, about half as long as the leaves while in flower, many-flowered, much condensed, corymbose, broader than long; the peduncles short, stout, somewhat 4-angled like the stout, short branches. Flowers in threes at the ends of the branchlets, sessile, white, clavate in bud. Calyx ·35 in. long, funnel-shaped, tapering gradually to the base: the mouth 5-lobed, the lobes broad, rounded, and with pale, cartilaginous tips. Petals 5 orbicular, glandular-dotted, much longer than the calyx-lobes, apparently calyptrate. Fruit (unripe and excluding the long calyxtube) globular-ovoid, '75 to 1 in. in length, and '75 in. in diam., crowned by the large, stout, withered, 5-toothed calyx-limb 25 in. long.

PERAK: Wray 3990; King's Collector 5309, 6584.

69. EUGENIA PEARSONIANA, King n. sp. A tree 80 to 100 feet high; young branches thicker than a crow-quill, pale brown or whitish, terete. Leaves coriaceous, ovate, the base rounded, the apex caudate-acuminate, the edges somewhat recurved; upper surface clivaceous-brown, shining, the numerous nerves faint, the midrib depressed; lower surface brown, dull, the nerves fainter than on the upper, the midrib sharp and prominent; length 2.75 to 4 in.; breadth 1.5 to 2 in.; petiole 25 to 3 in. Panicles terminal, 1.5 in. long, not pedunculate, branching from the base; the branches short, thick, slightly compressed and slightly 4-angled. Flowers in twos or threes at the ends of the branchlets, about 5 in. long (including the stamens), white, clavate in bud, some sessile and others on very short, stout pedicels. Calyx 25 in. long, funnel-shaped gradually tapering to the thick base; the mouth truncate. Petals 5, orbicular, calyptrate. Fruit unknown.

PERAK: King's Collector 3526.

Allied to *B. Prainiana*, but differing in the truncate calyx-limb, sessile panieles and thinner young branches the bark of which moreover is nearly white.

70. Eugenia Lævicaulis, Duthie in Hook. fil. Fl. Br. Ind. II, 492. A tree; young branches half as thick as a goose-quill, terete, very pale. Leaves coriaceous, oblong-lanceolate or oblong-elliptic, shortly and 546

abruptly acuminate, the base cuneate; upper surface dark-olivaceous (when dry) and shining, the midrib bold and depressed and the nerves not depressed but faint; lower surface chocolate-brown, dull, the numerous nerves and reticulations indistinct, the intramarginal line very close to the edge, faint; length 3.5 to 4.5 in.; breadth 1 to 1.6 in.; petioles 2 to 3 in. Panicles mostly terminal, but a few in the upper axils, condensed, much shorter than the leaves; branches few, crowded. very stout, obscurely 4-angled, shining. Flowers 5 or 6 in, long (including the stamens), in threes at the apices of the branchlets, the middle one on a short thick pedicel, the lateral pair sessile. Calyx 25 in. long, campanulate, tapering regularly to the base; the mouth with 5 small, bluntly triangular teeth reflexed after flowering. Petals orbicular, much larger than the calvx-teeth, calvptrate. Fruit when ripe as large as a cherry, depressed at both ends, pulpy, the apex crowned by the small circular remains of the calyx. Duthie in Hook. fil. Fl. Br. Ind. II, 492 (in part). E. inophylla, ? in Wall. Cat. 3600 and not of Roxb.

Malacca: Maingay Herb. prop. 3012 (K.D. 753 in part). Penang: Wallich; Curtis 750, 666, 2246, 2247.

Hitherto collected only in Malacca and Penang. This is one of three plants issued doubtfully by Wallich as *E. inophylla*, Roxb.; and one of two issued from Herb. Kew, as 753 Maingay. There are in Herb. Kew, three Maingayan sheets under the distribution 753. Two of these bore the same number in Maingay's own collection, viz., 3012: the third, which is imperfect, bore his 1558, and is a different plant from his 3012 and is really *E. anisosepala*, Duthie. *E. lævicaulis* is allied to *E. oblata*, Roxb., but has more contracted panicles with much shorter branches, more oblong flower-buds, shorter stamens, more faintly nerved leaves which are usually smaller.

71. Eugenia Goodenovii, King n. sp. A tree, 50 to 70 feet high; young branches somewhat thicker than a crow-quill, terete, with compressed nodes, the bark dull pale yellowish-grey. Leaves coriaceous, oblong-elliptic, rarely somewhat lanceolate, the base much cuneate, the apex acute or sometimes shortly and bluntly acuminate; both surfaces rather dull when dry, yellowish-brown, the lower somewhat paler, the main-nerves many pairs, inconspicuous on either surface as are the secondary nerves and the reticulations; the intramarginal nerve faint, about 1 in. from the edge; length 3.5 to 5.5 in.; breadth 1.5 to 2 in.; petioles 2 to 3 in. Panicles terminal and from the axils of a few of the upper leaves, 1.5 to 2 in. long and about as broad; the branches few, spreading, obscurely 4-angled. Flowers shortly pedicelled, (when expanded) from 2 to 3 in. across, the buds clavate from 2 to 3 in. long. Calyx funnel-shaped, the mouth with 4 broad, rounded lobes. Petals 4, sub-orbicular, calyptrate. Fruit broadly urn-shaped, the apex broad

and truncate, crowned in the middle by the short conical remains of the style, about 5 in. in diam. when dry and about 6 in. long, the base with a fleshy papilla and a short stout stalk. Syz. rigidum, Wall. Cat. 3581.

MALACCA: ?; Wallich; Goodenough 1759. SELANGOR: King's Collector 8741. DISTRIB.—Java.

Wallich's specimens of this are referred in the Flora of British India to E. chlorantha, Duthie. The better examples collected since Wallich's time by Messrs. Goodenough and Kunstler however shew this to be a distinct species, Wallich's specific name for which would have been retained but for the priority of DeCandolle's Eugenia rigida. This strongly resembles E. Zippelliana, Miq., as that species is represented at Kew.

72. EUGENIA LINOCIEROIDEA, King. A tree, 40 to 50 feet high; young branches when in flower as thick as a crow-quill (thicker when in fruit), dark-brown. Leaves coriaceous, lanceolate, shortly acuminate, the base cuneate; both surfaces of an olivaceous, leaden colour when dry, the upper very dark and shining, the nerves numerous, indistinct: the lower paler and dull, the nerves straight spreading, black, interarching less than '05 in. from the edge, the reticulations not prominent: length 2 or (rarely) 3 in.; breadth 6 to 1 in.; petioles 1 in. Panicles terminal, as long as the leaves when in flower (longer when in fruit), much branched, many-flowered, broader than long: main-branches subhorizontal, somewhat 4-augled, the branchlets acutely so. Flowers 4 in. long (including the stamens), sessile, the buds clavate. Calyx 3 in. long, funnel-shaped, the lower half narrowed into a vertically ridged pseudo-stalk; the mouth with 4 deep, broad, rounded lobes. Petals 4, sub-orbicular, calyptrate. Fruit oblong, with deep rugulose, vertical ridges, the apex crowned by the enlarged calyx-limb and its 4 inflexed teeth: length (unripe) 35 in.

PERAK: King's Collector 4580, 7980, 8094; Wray 1898, 2595.

73. Eugenia Myrtifolia, Roxb. Hort. Beng. 37; Fl. Br. Ind. II, 490. A shrub or small tree; young branches 4-angled, pale-brown, the older terete, greyish. Leaves thinly coriaceous, lanceolate to broadly ovate, shortly acuminate, the base acute: both surfaces shining, dotted, when dry brown, the lower paler; nerves close and numerous, thin but distinct on both surfaces; length 1.5 to 2.5 in.; breadth 75 to 1.35 in.; petiole 15 to 2 in. Panicles mostly terminal but a few from the upper leaf-axils, pedunculate, longer than the leaves; branches lax, spreading, corymbose, 4-angled. Flowers 3 in. long (including the stamens) sessile or pedicellate on the apices of the branchlets in twos or threes. Calyx 15 in. long, clavate, the mouth with 4 very narrow lobes or almost truncate. Petals 4, orbicular, calyptrate. Fruit globular, pisiform, pulpy, bluish-black, smooth, crowned by the cupular, truncate calyx-

limb, 1-seeded. Duthie in Hook. fil. Fr. Ind. II, 483; Wight Ill. II, 15; Ic. t. 618; Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 67; For. Fl. I, 486. Syzygium myrtifolium, DC. Prodr. III, 261; Wall. Cat. 3571; Miquel Fl. Ind. Bat. 1, Pt. I, 456. C. oleina, Wight Ill. II, 15.

SINGAPORE: Wallich. PENANG: Wallich. PERAK: Wray 2703; King's Collector 8379.

EUGENIA STAPFIANA, King n. sp. A shrub, 2 to 6 feet high; young branches rigid, slender, 4-angled, the bark brown and deciduous in long flakes. Leaves very coriaceous, lanceolate or broadly elliptic tapering to the blunt sub-acute (occasionally rounded and retuse) apex. the base slightly cuneate or rounded; both surfaces olivaceous-brown when dry, the upper with large scattered pits, the lower paler, not dotted or pitted, nerves and reticulations very indistinct on both surfaces, the midrib distinct on the lower: length 5 to 1 in.; breadth ·4 to ·8 in.; petiole under ·1 in. Panicles terminal, shorter than or as long as the leaves, few-flowered; the branches few, rigid, stout, square and with 4 thick wings. Flowers 3 in. long, with several bracteoles at their insertion on the short, stout, papillose pedicels. Calyx 15 in. long, narrowly campanulate, slightly inflated below the middle, ribbed and densely papillose externally, the mouth slightly expanded and with 4 or 5 spreading rounded teeth. Petals orbicular, free. Stamens about '15 in. long. Fruit sub-globular, crowned by the calvx lobes, white.

PERAK: Scortechini 336; Wray 216, 1582, 1619: at elevations of 5000 to 7000 feet.

This belongs to a group of dwarf montane species of Evgenia well-represented on the mountains of Ceylon and Southern British India and of which some species from the mountain of Kina Balu in Borneo have recently been described and figured in the Linnæan Transactions by Dr. O. Stapf. of the Kew Herbarium. The nearest ally of this is E. kinabaluensis, Stapf., from which this is distinguished by its larger inflorescence with winged branchlets, granular calyx-tube and pedicels, and less rotund leaves, entire (not retuse) at the apex.

75. Eugenia Wrayi, King n. sp. A small tree; young branches obtusely 4-angled, brown (when dry) smooth, the older terete, rough, the bark grey. Leaves thickly coriaceous, broadly elliptic or sub-rotund the apex obtuse or sub-obtuse entire, not narrowed at the base: upper surface brown, the nerves and reticulations faint, the midrib depressed; lower surface pale sub-glaucous, the nerves and reticulations numerous and distinct, the midrib broad; length 75 to 1.35 in.; breadth 65 to 1.15 in.; petiole 1 in. or less. Panicles solitary, compact, terminal, in a short peduncle; its branches short and stout, slightly 4-angled, not winged or papillose. Flowers greenish, 35 in. long, (including the stamens) sessile in clusters of 3 or 4 at the ends of the branchlets, with a single deciduous bracteole at the base of each, the buds

shortly clavate. Calyx funnel-shaped, 15 in. long; not much narrowed to the base, smooth; the mouth with 5 unequal, broad rounded lobes. Petals calyptrate. Stamens short. Fruit unknown.

Perak: at elevations of 5,000 to 7,000 feet; Wray 321, 1504, 3859; Scortechini 313.

This is another of the dwarf montane species. It resembles the Nilgiri E. calophyllifolia, Wight, very closely indeed and the differences between the leaves of the two can be appreciated only by comparison of actual specimens. The reticulations in the lower surface of this are finer and the enclosed spaces shorter. E. calophyllifolia has 4-merous flowers and the flowers of this are 5-merous. Fruit of this is at present unknown. From it, when found, a good character may, it is hoped, be obtained.

76. EUGENIA SETOSA, King n. sp. A shrub or creeper: young branches as thick as a crow-quill, dark-brown, densely clothed on the rachis and branches of the inflorescence with coarse subulate hairs mixed with brown scurf. Leaves thinly coriaceous, narrowly oblonglanceolate, shortly and abruptly acuminate, the base rounded; upper surface (when dry) olivaceous with minute scattered black dots, the lower tinged with brown, minutely pustulate: nerves very numerous and close, sub-horizontal, interarching very near the slightly recurved minutely undulate edge; length 1:35 to 2:75 in.; breadth :4 to :85 in.; petiole under 'l in. Panicles axillary and terminal, about as long as the leaves, pedunculate, with spreading many-flowered branches. Flowers crowded on the branchlets, 4 in. long (including the stamens), clavate, the buds with globular apex abruptly contracted below, sessile or on short pedicels. Calyx campanulate above, contracted about the middle into a pseudo-stalk; the mouth truncate but with 5 small triangular deciduous lobes. Petals orbicular, deciduous. Fruit turbinate, crowned by the small truncate calvx-limb, minutely covered with pellucid, granule-like glands; length and breadth about 35 in.

PERAK: Wray 2704; King's Collector 5266, 6601, 6793.

77. EUGENIA INASENSIS, King n. sp. A small white-flowered tree; young branches thicker than a crow-quill, terete with compressed nodes; the bark pale and rather smooth. Leaves coriaceous, broadly elliptic to elliptic-oblong, sometimes slightly obovate, much tapered to the base, the apex with a short, abrupt blunt point, the edges recurved; when dry, the upper surface shining, pale yellowish-brown, the midrib depressed; the lower paler and dull, the midrib bold; main-nerves inconspicuous on both; length 2.5 to 4 in.; breadth 1.25 to 2.25 in.; petiole 2 to 4 in. Panicles much shorter than the leaves, terminal or from the upper leaf-axils, solitary or several together, pedunculate, usually 3-branched, the peduncle and branches dark-coloured, compressed. Flowers in threes, 3 to 4 in. in diam. when expanded, their

buds obovoid nearly 2 in. long. Calyx campanulate, sessile, not tapering into a pseudo-stalk, the mouth with 5 small rounded lobes, or truncate. Petals 5, orbicular-calyptrate. Fruit unknown.

PERAK: or Gunong Inas at elevations of about 5,000 feet; Wray 4144, 4150, 5154.

A species known only from Mount Inas. It is allied to E. subdecussata, Duthie, in many respects, but differs from that species in having petiolate leaves tapering much to the base and having recurved edges. The main nerves are, moreover, less distinct and the under surface is not dotted. The twigs also differ in being very pale in colour instead of brown.

78. EUGENIA SUBDECUSSATA, Duthie in Hook. fil. Fl. Br. Ind. II. 491. A tree or shrub; young branches sub-terete, compressed below the nodes, brown. Leaves sessile or nearly so, coriaceous, elliptic or oblong-elliptic, rarely somewhat obovate-elliptic, (sub-rotund in VAR. montana), tapering but little to either end, the apex sometimes with a short blunt acumen, the base minutely cordate; both surfaces darkbrown when dry, the upper polished; the lower slightly paler and pellucid-dotted; nerves numerous but not prominent on either surface, the midrib prominent on the lower; length 2 to 5.5 in.; breadth 1.35 to 3 in.; petiole very short or absent (about 1 in. long in VAR. montana). Panicles terminal, shorter than the leaves, pedunculate, the peduncle and all the branches and branchlets much compressed; the branches short, crowded. Flowers 35 in. long (including the stamens), sessile in heads on the apices of the branchlets; the buds shortly clavate. Calux funnel-shaped, the mouth with 5 small triangular teeth. Petals calvptrate. Fruit globular, crowned by the small calvx-cup, smooth, 5 or 6 in. in diam. Syzygium subdecussatum, Wall. Cat. 3589 in part.

SINGAPORE: Wallich; Ridley 4662, 4814, 9498, 10389. MALACCA: Maingay (K.D.) 740; Derry 476, 975; Ridley 1985. PERAK: King's Collector; Scortechini; very common from the sea-level to elevations of 5,000 feet.

A species readily recognised by the elliptic polished leaves, tapering very little to either end, also by the compressed short branchlets of the inflorescence and the shortly clavate flowers.

VAR. colorata, King; panicle very condensed, flower-buds longer than in the typical form, leaves when dry tinged with red. E. colorata, Duthie in Hook, fil. Fl. Br. Ind. II.

MALACCA: Maingay (K.D.) 749.

Only a single specimen of this is known. It appears to me a form of E. sub-decussata, and unworthy of specific rank.

VAR. montana, King; shrubby; leaves often sub-rotund or obovoid elliptic, from 1 to 2.5 in. long; panicles longer than the leaves.

Perak: Scortechini 294; Wray 217, 3844. King's Collector 8030.

Syzygium apodum, Miq., a Sumatran species, closely resembles this but has thicker leaves with strongly recurved margins.

79. Eugenia punctulata, King. A tree, 30 to 50 feet high; young branches thinner than a goose-quill, slightly compressed, the bark pale-brown, deciduous in flakes, and the older branches grey. Leaves coriaceous, obovate or oblanceolate, the apex broad and usually blunt but sometimes with a short point, much narrowed at the base, the edges slightly recurved; upper surface olivaceous (when dry). shining, the nerves indistinct; lower olivaceous-brown, the numerous straight nerves and reticulations faint; length 1.5 to 3 in.; breadth 1 to 1.75 in.; petiole 2 to 25 in. Panicles rather lax, terminal, longer than the leaves (often twice as long, especially in the fruiting stage): branches numerous, spreading, compressed or 4-angled, many-flowered. Flowers sessile at the apices of the branchlets with a few scarious bracteoles at their bases. Ualyx campanulate, only 1 in. long, its mouth obscurely 4-toothed, smooth. Petals deciduous. Fruit ovoid, much wrinkled when dry and crowned by the wide calyx-limb, 4 in. long (unripe). Syzygium punctulatum, Wall. Cat. 3583. Jambosa punctulata, Miq. Fl. Ind. Bat. Suppl. 310.

SINGAPORE: Wallich. PERAK: King's Collector 3475, 3782, 6426, 6671, 6937, 10984; Wray 1125, 3972. SINGAPORE: Ridley 3893, 4988, 4989, 6540. MALACCA: Derry 1154. DISTRIB.—Borneo.

This is doubtfully referred in the Flora of British India to E. pyrifolia, Wall. The more complete specimens collected since that Flora was published show that E. punctulata is a perfectly distinct species.

EUGENIA BRACTEOLATA, Wight Ill. II, 15: Ic. t. 531. A tree, 30 to 60 feet high; young branches boldly 4-angled, pale-brown, about as thick as a goose-quill. Leaves coriaceous, oblong-obovate or oblanceolate, the apex broad and with a short blunt apiculus, rarely sub-acute, the base cuneate: when dry the upper surface dark-brown, shining, obscurely pitted, the nerves faint and impressed; the lower paler brown, neither pitted or dotted, the numerous pairs of horizontal nerves and the wide reticulations slightly distinct, the midrib very prominent; length 3 to 5 in.; breadth 1.5 to 2 in.; petiole 3 to 5 in. Panicles terminal, as long as the leaves, with small, ovate, concave bracteoles at all its nodes, corymbose, many-flowered, the branches few, the branchlets numerous and all (like the peduncle) acutely 4-angled and grooved. Flowers in threes at the apices of the branchlets: bibracteolate at the base and on short pedicels, 3 in. long including the stamens, globularclavate in bud. Calyx 15 in. long, shortly infundibuliform, rugulose, the mouth with 4 rounded lobes. Petals whitish, calyptrate. Fruit

oblong, tapering to each end, the apex crowned by the 4 persistent calyx-teeth, minutely rugulose, length (very unripe) 25 in. Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 66; For. Flora Burm. I, 482; Duthie in Hook. fil. Fl. Br. Ind. II, 488.

MALACCA: Maingay (K.D.) 770. PENANG: Curtis 1089, 3175. PERAK: very common. DISTRIB.—Burma: Griffith (K.D.) 2387; Helfer (K.D.) 2386, 2373.

Easily recognised by its profusely bracteolate inflorescence and acutely 4-angled branches and panicle. *Curtis's* 1089 is when dry of a much paler colour than the Perak specimens, otherwise it agrees.

81. EUGENIA VENULOSA, Wall. in Cat. ex Duthie in Hook. fil. Fl. Br. Ind. II, 490. A tree, 20 to 25 feet high; young branches thicker than a crow-quill, terete, pale. Leaves coriaceous, elliptic-rhomboid to oblanceolate, the apex obtuse or sub-acute, the base cuneate; upper surface pale-brown often with an olivaceous tint (when dry), dotted, shining, duller, the nerves faint; under surface paler, and not olivaceous, the mainnerves 10 to 14 pairs, rather straight, sub-erect, not much more promineut than the secondary nerves, both sets connected by numerous loops, the intramarginal nerves about 1 in. distant from the slightly recurved edge; length 2 to 3 iu.; breadth 8 to 2.2 in.; petiole 1 to 15 in. Panicles terminal, broadly corymbose, much-branched, usually shorter or not much longer than the leaves (longer in VAR.); peduncle and branches 4-angled, the flowers in threes at the apices of the branchlets, clavate in bud, sessile. Calyx 2 in. long, rugulose, campanulate in its upper half, the lower contracted, the mouth truncate, or slightly lobed. Petals calyptrate. Fruit globular, submamillate, the apex with a deep, circular, entire pit bounded by the calyx-walls, 5 in. in diam.

MALACCA: Griffith (K.D.) 2405; Maingay (K.D.) 741. SINGAPORE: Wallich; Ridley 5985. Johore: 4986. Perak: Scortechini 188; Wray 3016.

VAR. macrothyrsa; panicles longer than the leaves and as much as 4 in. broad.

Malacoa: Griffith (K.D.) 2405; Derry 21; Maingay (K.D.) 719. JOHORE: Ridley 4196. PERAK: Scortechini 188.

82. EUGENIA PSEUDO-SUBTILIS, King. A tree, 30 or 40 feet high; young branches pale greyish-yellow, or almost white, slightly thicker than a crow-quill, terete. Leaves very coriaceous, narrowly oblong-elliptic tapering from the middle to each end, the apex sub-acute or obtuse, the base cuneate; both surfaces when dry dull, pale-brown; the upper pellucid-pitted and the nerves faint; the lower paler not pitted, the midrib prominent but the 5 to 7 pairs of main-nerves faint, sub-erect, curved, not interarching near the edge, length 2.25 to 4 in.;

breadth 1.1 to 1.25 in. petiole 5 to 75 in. Panicles shorter than or nearly as long as the leaves, axillary and terminal, often 2 or 3 together, few-branched; the branches divaricate, 4-angled, few-flowered, trichotomous. Flowers sessile, small. Calyx only 05 in. long, at first almost cylindric slightly narrowed to the base, afterwards urn-shaped and finally globular, the mouth with a projecting rim, truncate but with 4 broad, shallow teeth. Fruit the size and shape of a pepper-corn, smooth, surmounted by the small remains of the calyx and by the base of the style. E. brachiata, Duthie (not of Roxb.) in Hook. fil. Fl. Br. Ind. II, (in part).

Penang: Curtis 3475. Perak: King's Collector 6946. SINGAPORE: Ridley 4990.

VAR. platyphylla; leaves broader than in the typical form, elliptic, oblanceolate-oblong, sub-acute or with broad rounded apex, the base always caneate.

SINGAPORE: Ridley 3962. MALACCA: Derry; Scortechini. PERAK: PENANG: Curtis 32. Syzyg. ribesoides, Wall. Cat. 3553. Syzyg. cinereum, Wall. Cat. 3576.

VAR. subacuminata; leaves bluntly acuminate.

Penang: King's Collector 1793.

This species closely resembles S. subtile, Miq., in its pale branches, in the shape and texture of its leaves and in its flowers. The leaves however have only about one-third as many nerves. The two are however very near.

83. EUGENIA MICROCALYX, Duthie in Hook. fil. Fl. Br. Ind. II, 493. A tree, 40 to 50 feet high; young branches slender, 4-angled, brown. Leaves coriaceous, oblong-obovate or oblong-lanceolate, sub-acute, much narrowed from the middle to the base; upper surface blackish-brown when dry, the nerves faint: lower warm-brown the nerves and midrib prominent: main-nerves 10 to 14 pairs, rather straight, ascending, interarching 15 in. from the edge in a bold wavy line; the edges much and irregularly recurved when dry; length 2.25 to 3.5 in.; breadth 1.25 to 2 in.; petiole 25 to 3 in. Panicles terminal and axillary, as long as or longer than the leaves, on long slender peduncles; branches and branchlets lax, spreading, compressed, with minutely triangular persistent bracteoles at their bases. Flowers yellowish-white, sessile, in heads at the ends of the branchlets, small (only 2 in. long including the stamens), bracteolate at the base. Calya 15 in. long, funnel-shaped, minutely granular; the mouth with 4 small distant triangular lobes. Petals 4, calyptrate. Fruit (probably unripe) as large as a pepper-corn, globular, crowned by the wide calyx-limb, white tinged with red.

MALACCA: Griffith (K.D.) 2410 (in part), 2411. Derry 3531; Maingay (K.D.) 727, 731. SINGAPORE: Ridley 2054. Perak: King's

Collector 5986, 5990, 6627, 8129, 8700, 10417, 10735.

VAR. obovata; leaves obovate or obovate-lanceolate.

PERAK: King's Collector 6627, 10417, 8129, 8700, 5990, 5986, 8700.

84. Eugenia scoparia, Wall. Cat. 3594. A tree? Young branches about as thick as a crow-quill, terete, pale-brown, smooth. Leaves coriaceous, oblanceolate to obovoid, occasionally elliptic-lanceolate, the apex sub-acute or obtuse, the base always cuneate; upper surface brown and with numerous small pits, the lower paler and with numerous minute black glands, midrib depressed on the upper and prominent on the lower surface, the nerves almost invisible on both; length 1.25 to 2.25 in.; breadth 6 to 1.1 in. Panicles terminal and from the upper leaf axils, longer than the leaves, on slender, rather long, 4-angled peduncles bearing near the apex a few divaricate laxly-flowered branches. Flower-buds clavate, about 15 in. long; mouth of calyx wide, shortly 4-lobed, the tube short and abruptly contracted at the base. Fruit almost globular with a truncate apex, smooth, 1 in. in diam. Duthie in Hook. fil. Fl. Br. Ind. II, 489. Syzygium scoparim, Wall. MSS.? S. avene, Miq. Fl. Ind. Bat. Suppl. I, 312.

SIGNAPORE: Wallich. MALACCA: Goodenough 1649.

Specimens of a species nearly allied to this were collected at Changi in Singapore by Mr. Ridley in October 1890 and again at Selangor (Herb. 7555) in 1896. They differ in having the leaves broader, more pronounced obovate, and almost without dots or glands.

85. Eugenia myriantha, King n. sp. A tall tree; young branches slightly thicker than a crow-quill, terete. Leaves very coriaceous, oblanceolate sub-acute, the base much narrowed; when dry upper surface pale-brown, shining, dotted; the lower darker brown, dull, sub-glaucous; nerves 3 or 4 pairs, on each side very faint, distant, ascending: reticulations on both surfaces invisible, the edges slightly recurved; length 1 to 1.75 in.; breadth .5 to .75 in.; petiole .25 to .3 in. Panicles very numerous, longer than the leaves, terminal or in the upper axils, pedunculate; branches numerous, spreading, the branchlets quadrangular and bearing at their apices numerous small sessile flowers with broad rounded bracteoles at their bases. Flowers only .1 in. long, truncate in bud. Calyx cylindric, the mouth very obscurely lobed. Fruit unknown.

PERAK: Scortechini 337.

A species resembling *E. microcalyz*, Duthie, in its inflorescence and very small flowers and also in the character of the venation of the leaves which however are much smaller.

86. EUGENIA VERECUNDA, Duthie in Hook. fil. Fl. Br. Ind. II, 496. A small tree; young branches as thick as a crow-quill, pale yellow, terete, smooth. Leaves thinly coriaceous, ovate, acuminate, the base

broadly cuneate; upper surface brown when dry, shining; the lower very pale brown, dull; the numerous nerves, reticulations and intramarginal nerve rather distinct on both surfaces but especially on the upper when dry; length 2 to 3 in.; breadth .75 to 1.5 in.; petiole .35 to .6 in.; slender. Panicles crowded at the apices of the branches and in one or two of the upper leaf-axils, shorter than the leaves, on short peduncles, the branches slender, lax, 4-angled. Flowers only .15 in. long, sessile or on short pedicles, clavate, constricted immediately below the turbinate apex. Calyx-tube somewhat ribbed, the wide mouth with 4 shallow distant lobes. Petals calyptrate. Fruit unknown. Syzygium verecundum, Wall. Cat. 3579.

MALACCA: Griffith. PENANG: Wallich. SINGAPORE: Ridley 9486. PANGKORE: Scortechini 163.

87. EUGENIA SWETTENHAMIANA, King n. sp. A tree, 60 to 70 feet high; young branches thinner than a goose-quill, terete, very pale, faintly striate. Leaves thickly membranous, elliptic-oblong to obovatelanceolate narrowed to the rounded base, the apex shortly and bluntly acuminate; upper surface dark-brown the nerves and midrib impressed; lower surface pale-brown, the midrib and main-nerves prominent; the latter 9 to 12 pairs curved and interarching to form a stout intramarginal nerve 'l in. from the margin, the reticulations indistinct on both surfaces; length 3.5 to 4 in.; breadth 1.2 to 1.75 in.; petiole .25 to .35 in. Panicles several together at the ends of the branches, as long (with their peduncles) as the leaves or longer, each bearing near its apex a few slender 3-flowered umbellate branches, the branchlets, pedunclebranches and branchlets compressed and 4-angled. Flowers greenishwhite, 35 in. across when expanded; the buds before expansion clavate. ·2 in. long. Calyx funnel-shaped, sessile, contracted at the base, its mouth with 4 broad, rounded, deciduous lobes. Petals 4, sub-orbicular, free, as large as the calyx-lobes. Stamens short. Fruit unknown.

PERAK: Scortechini; King's Collector 7590.

A species near *E. pseudo-subtile*, King, but with oblanceolate leaves and long slender pedunculate umbellate panicles crowded at the apices of the twig. Named to commemorate the help afforded in the Botanical exploration of Perak by Sir Frank Swettenham, K.C.M.G.

88. Eugenia acuminatissima, Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 67; Fl. Br. Burm. I, 487. A tree, 20 to 50 feet high; young branches about as thick as a crow-quill, slightly compressed, the bark pale-brown, peeling off in vertical flakes. Leaves coriaceous, lanceolate or oblong-lanceolate, the apex caudate-acuminate, the base cuneate; both surfaces pale-brown when dry, the upper tinged with clivaceous, shining, the midrib depressed, the main-nerves 15 to 20 pairs, slightly raised, faint; lower surface darker than the upper, the 556

nerves faint, the intramarginal line rather less than '1 in. from the edge; length 25 to 4 in.; breadth '9 to 1'4 in.; petiole '2 to '25 in. Panicles usually large, lax, many-branched, pedunculate, longer than the leaves, mostly terminal but some also from the upper leaf-axils: branches acutely 4-angled, the upper also compressed. Flowers numerous, small, white, sessile, usually in threes from the ends of the branchlets, '2 in. long (including the stamens). Calya turbinate-clavate, nearly '2 in. long, the lower half contracted, the upper part turbinate its mouth truncate or very obscurely toothed. Petals 5 or 6, minute, rotund, clawed, erose, free. Fruit depressed-globular, crowned by the minute circular remains of the calyx, '4 to '5 in. broad and about '35 to '4 in. long. Duthie in Hook, fil. Fl. Br. Ind. II, 483. Jambosa acuminatissima, Hassk. in Flora (1849), 592; Miq. Fl. Ind. Bat. I, 438. Syzyg. altissimum, Wall. Cat. 3588. Myrtus acuminatissima, Blume Bijdr. 1088.

In all the Provinces except the Nicobar Islands. DISTRIB.—Burma, Sumatra.

89. Eugenia Kunstleri, King n. sp. A tall tree; young branches thinner than a goose-quill, terete, pale. Leaves thinly corinceous, ovatelanceolate, acuminate, much narrowed at the base: upper surface brown (when dry), with small depressed dots, the nerves indistinct: lower palebrown with numerous small black dots: main-nerves bold on the under surface, 8 to 10 pairs, curving upwards and interarching 1 to 15 in. from the edge; length 3.5 to 5.5 in.; breadth 1.5 to 2.25 in.; petiole 4 to 5 in. Panicles terminal or from the upper leaf-axils, much shorter than the leaves; the short peduncle and the numerous spreading branches 4-angled, with many small pustules, minutely bracteolate at the divisions. Flowers small, numerous, greenish-yellow, in threes at the apices of the branchlets, sessile. Calyx 1 in., funnel-shaped, the mouth with 4 obscure broad teeth. Petals orbicular. Fruit ovoid, contracted somewhat at the base and crowned by the short wide calyx-limb, smooth, 5-6 in. long.

PERAK: King's Collector 3310, 3680. PENANG: Curtis 179.

A species of which the nearest allies are *E. pustulata*, Duthie, and *E. brachiata*, Roxb., but with more slender panicles and smaller flowers than the former and more acuminate leaves than the latter. It also resembles *E. minutiflora*, Miq., but that has broadly ovate shortly acuminate leaves and shorter panicles.

90. EUGENIA PUSTULATA, Duthie in Hook. fil. Fl. Br. Ind. II, 495. A tree, 20 to 50 feet high; young branches thinner than a goose-quill, terete, pale-brown, minutely warted. Leaves coriaceous, oblong or oblong-lanceolate, shortly acuminate, much narrowed to the base: upper surface (when dry) smooth, shining, greenish, the nerves usually

indistinct; the lower brown with many minute papillæ especially on the prominent midrib; main-nerves 10 to 14 pairs, curving upwards and interarching 1 in. from the margin, pale, and prominent on the lower surface; length 45 to 7 in.; breadth 135 to 225; petiole 3 to 4 in. Panicles small, several together, shorter than the leaves, terminal or from the upper leaf-axils, branching from the base, the branches spreading, papillose, stout, 4-angled. Flowers few, sessile, 25 in. long (including the stamens), truncate in bud. Calyx campanulate, minutely papillose externally; the mouth wide and with 4 short, broad, sub-acute lobes. Petals calyptrate. Fruit globular, the apex with a circular pit surrounded by the wide, short, cupular remains of the calyx, smooth, 4 to 5 in. in diam.

MALACCA: Maingay (K.D.) 751. SINGAPORE: Ridley 4657, 4979, 6420, 6421. PERAK: King's Collector 3724, 6758, 7536.

A species recognisable by its short stout panicles with short widely campanulate flowers, and pustulate stems and panicles. The leaves (when dry) are distinguished by their colour, greenish above and brown beneath.

91. Eugenia Koordersiana, King n. sp. A tree, 40 to 80 feet high; young branches somewhat thicker than a crow-quill, terete, dark purplish-brown when dry. Leaves coriaceous, elliptic or narrowly ovate, rarely oblanceolate, shortly caudate-acuminate, the base cuneate; both surfaces (when dry) very dark brown, the lower slightly paler; mainnerves 8 to 10 pairs, curving slightly and interarching 1 in. or more from the edge, impressed on the upper surface slightly prominent on the lower; length 2.75 to 3.75 in.; breadth 1 to 1.75 in.; petiole about 3 in. Panicles terminal, usually much longer than the leaves, corymbose, many-branched, the peduncle and branches sharply 4-angled, compressed at the nodes; branchlets 3- to 5-flowered at the apex. Flowers white, clavate in bud, sessile. Calyx campanulate, 4-angled, 15 in. long, contracted for half its length into a pseudo-stalk; the mouth with 4 deep, broad, rounded lobes. Petals 4, sub-rotund, calyptrate. Fruit unknown.

PERAK: Scortechini 257; King's Collector 6208, 6233, 6385.

When dry the leaves and panicles of this are very dark-coloured. It is allied to *E. pseudo-subtilis* and *E. Clarkeana*, but differs from both in leaves. I have named it in honour of Dr. S. H. Koorders of the Forest Dept. in Netherlands India.

92. Eugenia simulans, King n. sp. A tree, 30 to 40 feet high, with pendulous branches: young branches terete, the very youngest compressed and about as thick as a crow-quill, brown. Leaves thinly coriaceous, oblong or elliptic-lanceolate, shortly and rather bluntly acuminate, the base cuneate; both sides dark-brown and shining when dry, the lower paler and duller, slightly olivaceous; nerves numerous,

straight, inconspicuous like the reticulations, intramarginal nerve very near the edge; length 4.5 to 5.5 in.; breadth 1.75 to to 2.25 in.; petiole 3 to 4 in. Panicles mostly axillary, sometimes terminal, 3 to 4 in. long, pedunculate, pyramidal, the branches nearly horizontal, all terete. Flowers mostly in threes at the apices of the branchlets, sessile, clavate in bud. Calyx nearly 15 in. long, obconic, with a sub-obtuse base; the mouth thickened, undulate, indistinctly 5-toothed. Petals calyptrate. Stamens unequal. Fruit unknown.

PERAK: Scortechini 83, 274.

This resembles *E. Bernardi*, King, but differs in having clavate, not shortly obovoid, flower-buds, and in its panicles being usually lateral not terminal. The leaves of the two are much alike. Ridley's specimens collected in the garden jungle (8104 and 9845) probably belong to this but the panicle is laxer and its branches thinner.

93. EUGENIA CURTISH, King n. sp. A tree, 60 to 80 feet high; young branches thinner than a goose-quill, terete, the bark brown and peeling off in flakes. Leaves coriaceous, oblong-lanceolate or oblongelliptic, rarely oblanceolate, the apex shortly and bluntly acuminate, the base cureate, the edges slightly recurved when dry, both surfaces when dry pale olivaceous-brown, shining, obscurely pustulate, the lower less shining and darker in colour than the upper and with numerous very distinct minute conical concolorous pustules; the midrib depressed on the upper but prominent and pustulate on the lower surface; main and secondary nerves numerous, spreading, interarching less than 'l in. from the slightly recurved edge, rather distinct on the lower but faint on the upper surfaces; length 3 to 5.5 in.; breadth 1 to 2 in.; petioles 15 to 2 in. Pauicles terminal, from half as long as to as long as the leaves, branched from the base, dense, many-flowered, broader than long, the main-branches spreading, terete, the secondary and tertiary acutely 4-angled, all stout, the bark very granular, ultimately flakey. Flowers crowded at the ends of the branchlets, 2 in. long (including the stamens), sub-globose in bud. Calyx campanulate, narrowed to the base and produced into a short pseudo-stalk, granular, shining: the mouth wide, with 5 small, broadly triangular teeth. Petals 5, papillose outside, orbicular, ? calyptrate. Fruit unknown.

Perak: Wray 2968, 3102; King's Collector 6149.

VAR. minor; flowers smaller (rather less than '2 in. long, including the stamens): Calyx not produced into a pseudo-stalk, its mouth obscurely lobed: leaves 2.5 to 3 in. long.

PERAK: Wray 194. MALACCA: Harvey.

94. EUGENIA OPERCULATA, Roxb. Hort. Beng. 37; Fl. Br. Ind. II, 486. A tree, 30 to 50 feet high; young branches slightly compressed, dotted and grooved at first, afterwards terete, the bark pale-brown at first but

ultimately grey. Leaves thinly coriaceous, variable in shape, ovateoblong to elliptic and (in VAR. 2) obovate, shortly acuminate, bluntly apiculate or (in VAR. 2) obtuse, the base cuneate; both surfaces olivaceous when dry, the lower paler and minutely dotted: main-nerves distinct on the lower surface, 8 to 12 pairs, curved, ascending, becoming faint towards the intramarginal nerve: length 4 to 6 in.; breadth 1.6 to 2.2 in.; petiole 2 to 3 in. Panicles from the branches below the leaves. 2 or 3 inches long, pedunculate, spreading, lax; the branches divaricate, trichotomous, 4-angled. Flowers in threes at the apices of the branchlets, greenish, sessile. Calyx smooth, campanulate, contracted at the base; the limb truncate. Petals 4, calyptrate, orbicular, concave, about 'l in. Fruit pisiform, smooth, very dark purple, pulpy, 1-seeded. Wight Ic. t. 552; Brandis For. Fl. 234; Kurz For. Fl. I, 483; Duthie in Hook, fil. Fl. Br. Ind. II, 498. E. cerasoides, Roxb. Hort. Beng. 92; Fl. Ind. II, 488; Wight Ic. t. 615; Miq. Anal. Bot. Ind. I, 27; Fl. Ind. Bat. I, Pt. 1, 443; Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 66; For. Fl. I, 484. Syzygium nervosum, DC. Prodr. III, 260; Mem. Myrt. II, 16; Wall. Cat. 3551 A & B; 3553 B & C (under E. ribesioides); Benth. Fl. Hongk. 119; Thwaites Enum. 417; Miq. Fl. Ind. Bat. l.c. 460 Bedd. Fl. Sylv. Anal. Gen. CVI. S. costatum, nodosum, and angkolanum, Mig. Fl. Ind. Bat. l.c. 448. Calyptranthes mangiferifolia, Hance in Walp. Ann. II, 629. C. costata, Ham. in Wall. Cat. 3556. C. grandis and C. Tatna, Ham. in Wall. Cat. 3554, 3555.

PERAK: Scortechini 306. PENANG: Curtis 1444. DISTRIB.—British India, S. China and the Malay Archipelago.

Two varieties have been separated off but I have no specimens of either from any of the Provinces in our region. These are described as follows by Mr. Duthie in Hooker's Flora of British India.

VAR. Paniala; berries oval. E. Paniala, Roxb. Fl. Ind. II, 489; Wight Ic. t. 616; Kurz For. Fl. I, 483. Syz. Panealla, Wall. Cat. 3557? Calyptranthes cuneata, Ham.?

var. obovata, Kurz For. Fl. I, 482; leaves obovate or oblanceolate, cymes more compact. Syz. obovatum, Wall. Cat. 3552, not of DC. S. vastum, Wall. Cat. 3661. S. polyanthum, Thwaites; not of Wight.

A third variety occurs in Perak but it has as yet been only once collected. It may be distinguished as follows.

VAR. coriacea; leaves thicker than in the type and not dotted or very obscurely dotted on the lower surface.

PERAK: Wray 2725, at Matong on the sea-coast.

95. EUGENIA NICOBARICA, King. A tree? Young branches rather thinner than a goose-quill, terete, somewhat rough, grey. Leaves thinly coriaceous, lanceolate or elliptic, the apex sub-acute, the base cuneate;

both surfaces (when dry) olivaceous-brown, the upper shining, with the midrib and main-nerves depressed; the lower paler and dull; main-nerves 5 to 8 pairs, faint on both surfaces; reticulations few, faintly visible on the lower invisible on the upper surface; length of the lanceolate form 2.5 to 3 in., of the elliptic form 3 to 4.5 in.; breadth respectively 1 to 1.5 in. and 1.5 to 2.5 in.; petiole 6 to 8 in. Panicles numerous, crowded on the branches below the leaves, trichotomous, 1 to 2 in. long, with a few divaricating, few-flowered branches. Flowers in threes at the ends of the branchlets, 25 in. long (including the stamens), sessile or on short, stout 4-angled pedicels, obovoid in bud. Calyx 1 in. long, lengthening to 2 in. after fertilization, campanulate with a 4 in. wide, truncate, irregularly toothed thickened mouth, much narrowed to the base but not constricted into a pseudo-stalk. Petals 4 orbicular, calyptrate. Fruit unknown. E. occlusa, Kurz in Hook, fil. Fl. Br. Ind. II, 498 (not of Miquel).

NICOBAR ISLANDS: Kurz.

This has been collected only in the Nicobar islands and there only by Kurz who referred it to Syzygium occlusum, Miq. But it differs so much from an authentic specimen of that species in the Horsfield collection and from Miquel's own description, that I have given it a new name.

96. EUGENIA JAMBOLANA, Lamk. Dict. III, 198. A small tree; young branches thinner than a goose-quill, terete, very pale when dry. Leaves coriaceous, rather variable, rotund-ovate to oblong-ovate, bluntly and shortly acuminate, sub-acute or obtuse, slightly narrowed at the base; both surfaces brown when dry, the under paler; nerves and their connecting reticulations numerous, distinct when dry on both surfaces but especially on the lower, intra-marginal nerve and midrib prominent on the lower; length 2.5 to 4 in.; breadth 1.5 to 2.25; petiole 6 to 75 in. Panicles from the branches below the leaves, much branched; the branches divaricate, all terete, many-flowered, longer than the leaves. Flowers whitish, sessile, 4 in. across. Calyx campanulate, suddenly contracted into a stout pseudo-stalk less than half its length, the limb at first obscurely and broadly 4-toothed but ultimately truncate. Petals 4, orbicular, rather more than 'l in. long, calyptrate. Fruit ovoid-oblong, about the size of an olive, pulpy, smooth, dark-purple, 1-seeded. Ham. in. Wern. Soc. Trans. V, 342; Roxb. Fl. Ind. II, 484; Wight Ic. t. 535; Benth. Fl. Austral. III, 283; Bedd. Fl. Sylv. I, t. 197; Brandis For. Fl. 233; Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 67; For. Fl. I, 485. Duthie in Hook. fil. Fl. Br. Ind. II, 499. Syz. Jambolanum, DC. Prodr. III, 259; Wall. Cat. 3560; W. and A. Prodr. I, 329; Dalz. and Gibs. Fl. Bomb. 93. E. frondosa, Wall. Cat. 3560 G: not 3590. E. Moorei, F. Muell. Fragm. V, 33. Calyptranthes Jambolana, Willd. Sp. Pl. II, 975. C. capitellata,

Ham. in Wall. Cat. 3560 B. E. caryophyllifolia, Lam. Dict. III, 198; Roxb. Hort. Beng. 37; Fl. Ind. II, 486; Wight Ic. II, 553. E. calyptrata, Roxb. Ic. 1142? Syz. caryophyllifolium, DC. Prodr. III, 259; Wall. Cat. 3562 partly, and 3551, C.; Thwaites Enum. 116. S. Jambolanum, var. microcarpum, Thwaites Enum. 417; Wall. Cat. 3562 C. Syz. lateriflorum, Royle. Myrtus Cumini, Linn.: exclude syn. Rumph. and Burm.—Pluk. Alm. t. 274, 2. Rheede Hort. Mal. V, t. 29. Rumph. Herb. Amb. I. t. 41. E. obtusifolia, Roxb. Hort. Beng. 37; Fl. Ind. II, 485; Wight Ic. t. 620. Jambolifera pedunculata, Gaertu. Fruct. I, 78, t. 36.—Rumph. Herb. Amb. I, t. 42; (bad).

Not uncommon in cultivation in all the provinces and also in British Iudia but rarely wild in any of the Malay provinces. The fruit although rather austere is eaten.

#### Species of Doubtful Position.

The under-noted three species were described by Mr. Duthie in Hooker's Flora of British India. They are all founded on scanty specimens collected by Maingay. I quote the author's descriptions verbatim.

E. fusiformis, Duthie; young branches 4-gonous, leaves petioled obovate-lanceolate cuneate below subcoriaceous pellucid-punctate, lateral nerves rather close, cymes terminal compact branches angular and somewhat winged, flowers 2 or 3 together on short pedicels, calyx-tube narrowly fusiform much produced above the ovary.

MALAYA: Maingay 743.

Bark yellowish. Leaves 4½ by 3 in., shining a little above, minutely dotted; midrib and nerves dark-coloured; lateral nerves uniting within the margin; petiole about ½ in. Calyx-tube ½ in. in length and ½ in. across at the widest part; lobes 4, rounded, reflexed after flowering. Style persistent, exserted portion equalling the calyx-tube.—Closely allied to 2236 of Beccari's Borneo plants.

E. maingayi, Duthie; leaves shortly petioled long oblong-lanceolate acuminate rounded at the base, racemes short axillary or from the leafless axils of the rugged lower branchlets, calyx-tube elongate clavate about  $\frac{2}{5}$  in, glandular, lobes 4 rounded deciduous.

MALAYA: Maingay 750.

Older branchlets with rugged corky bark, upper stout, terete, reddish. Leaves  $4\frac{1}{2}-7\frac{1}{4}$  by  $1\frac{3}{4}-2\frac{1}{4}$  in., indistinctly nerved above, midrib stout beneath; petiole  $\frac{1}{3}$  in. Style short, acute.—This plant seems to approach nearest to E. claviflora, and has a general resemblance to E. borneensis, Miq. Fl. Ind. Bat. I, Pt. 1, 434 (Jambosa), but the petioles of the latter are much longer.

E. tumida, Duthie; leaves oblong-ovate or obovate shortly acuminate narrowed at the base closely nerved, cymes terminal and axillary equalling or exceeding the leaves, calyx-tube  $\frac{\pi}{10}$  in. narrow swollen below the middle.

MALACCA: Maingay 755.

Branchlets terete. Leaves  $2\frac{1}{4}-3\frac{1}{2}$  in., chocolate-coloured above, rusty-yellow beneath when dried; lateral nerves slender, uniting close within the margin; petiole  $\frac{1}{4}$  in. Panicles lax, spreading; branches acutely angular. Calyw with 4 nearly equal shallow lobes.—The petals are probably free, though not expanding. The swollen part of the calyx-tube is occupied by the ovary.

### 9. PSEUDO-EUGENIA, Scortechini.

Trees with opposite punctate leaves and few-flowered, axillary, minutely bracteolate inflorescence. Calyx-tube turbinate or oblong, its mouth with 4 small rounded lobes, and bearing a thin annular staminiferous disc. Petals 4, orbicular, clawed. Stamens 8, in two rows; filaments inflexed in bud; anthers small, 2-celled. Ovary 2-celled. Style short. Ovules numerous, in several series on the placentas. Fruit as in Eugenia, 1- to 2-seeded. DISTRIB.—2 species, both Malayan.

A genus which differs from Eugenia chiefly in having only 8 stamens.

Leaves 4.5 to 6 in. long

1. P. perakensis.

" 1.5 to 2.5 in. long

2. P. singaporensis.

1. PSEUDO-EUGENIA PERAKENSIS, Scortechini in Journ. Bot. XXIII (1885), 153. A tree, 15 feet high; young branches thin, terete. Leaves thinly coriaceous, elliptic-lanceolate, slightly narrowed at the base, the apex with a slender obtuse acumen, pellucid-punctate, the main-nerves close, inconspicuous on the upper surface, sub-horizontal, interarching near the margin; length 45 to 6 in.; breadth 1.5 to 2 in.; petioles short. Calya-lobes incurved. Petals 4, small, free, spreading, distant. Stamens short. Berry pisiform. Eugenia skiophila, Duthie in Hook. fil. Fl. Br. Ind. II, 486.

PENANG: Maingay. PERAK: Scortechini.

2. PSEUDO-EUGENIA SINGAPORENSIS, King n. sp. A tree, 30 to 40 feet high; young branches as thin as a crow-quill or thinner, terete, smooth, dark-brown. Leaves thinly coriaceous, elliptic-lanceolate, slightly narrowed at the base, the apex abruptly and bluntly acuminate; both surfaces (when dry), dull and of a uniform dark-brown colour; the upper with the midrib depressed and the main-nerves and reticulations obscure; the lower minutely warted; the main-nerves numerous, faint, interarching near the edge; length 1.5 to 2.5 in.; breadth 45 to .7 in.; petioles 1 to .15 in. Panicles shorter than the leaves, axillary, few-branched and few-flowered; the peduncle and branches very slender, dark coloured, 4-angled. Flowers clavate in bud and greenish. Fruit unknown.

SINGAPORE: Ridley 2909; King's Collector 1242, 5957, 8710.

Note.

In addition to the two species above described there are in the Calcutta Herbarium specimens of what appears to be a third species of this genus collected by Mr. Harvey near Malacca. In these specimens the leaves are ovate with acute apices and cuneate bases, and 5 to 7 pairs of ascending main-nerves rather prominent on the lower surface. The leaves are from 3 to 4 inches long and about half as much in breadth. The flowers measure about '3 in. in length and rise in pairs from the stems below the leaves. Mr. Forbes also collected in Sumatra specimens (Herb. Forbes 2889) of a small tree with elliptic, caudate-acuminate leaves

cuneate at the base, which probably belong to a fourth species of Pseudo-eugenia. The flower-buds of this, which measure less than '1 in. in length, are borne in pairs below the leaves.

#### BARRINGTONIA, Forst. 10.

Trees. Leaves alternate, crowded towards the ends of the branches, entire or slightly crenate-serrate, pinnate-nerved, not dotted. Flowers in elongated terminal and lateral racemes, or in interrupted spikes; bracts small, deciduous. Calyx-tube ovoid or turbinate, scarcely produced above the ovary; lobes 2-4, valvate, or 3-5, imbricate. Petals 4 rarely 5, much imbricate, somewhat adnate at the base to the staminal tube. Stamens numerous, in several series, connate into a short tube at the base; filaments filiform, long, all bearing anthers. Ovary inferior, 2-4-celled, crowned by an annular disc; style long, filiform, simple, stigma small; ovules 2-8 in each cell, pendulous. Fruit fibrous or somewhat berried, globose, ellipsoid or quadrangular, crowned by the calyx, by abortion 1-seeded. Seed ovoid or ellipsoid, without albumen; embryo large, exhibiting two layers, cotyledons nearly obsolete. DISTRIB.—Species 25; in tropical Asia, Africa, Australia and Polynesia, often near the sea.

Sect. I. BUTONICA. Calyx closed in bud and entire, ultimately splitting into 2 or sometimes into 3 lobes: flowers pedicelled.

Racemes short, erect or sub-erect; fruit conical. Racemes terminal, erect; flowers 2.5 to 3 in. long and of greater diameter; fruit angled but not winged at the base

Racemes lateral or terminal, sub-erect; flowers less than I in. in diam.; fruit with 8 downward-pointing wings at the base ...

Racemes elongated, pendulous; fruit ovoid Sect. II. STRAVIDIUM. Calyx with 4 (sometimes 3 or 5) imbricate lobes.

Racemes terminal, erect, short, 1- to 3-flowered 4. B. pauciflora. Racemes lateral, pendulous, elongate, many-flowered. Flowers more than 5 in. across; leaves with distinct petioles from 7.5 to 3 or 4 in. in length. Flower-buds just before expansion about '25 in. long; fruit ovoid or elliptic, not angled or only slightly so; rachis much thickened in fruit ... Flower-buds just before expansion more than '25 in. long; fruit oblong, 4-angled.

Main-nerves of leaves 6 or 7 pairs; fruit 3 in. long; rachis of spike thickening slightly in fruit Main-nerves of leaves 9 to 12 pairs; fruit glabrous, acutely 4-angled, less than 2 in. long; rachis of spike hardly thickening in fruit ... 7. B. sumatrana.

B. speciosa.

2. B. conoidea.

3. B. racemosa.

5. B. macrostachya.

6. B. Scortechinii.

Main-nerves of leaves 8 to 12 pairs; fruit minutely pubescent, 4 or 5 in. long; rachis of spike thickening much in fruit ... 8. B. musiformis. Flowers less than '5 in. across; leaves sessile or with very short petioles.

Flowers pedicelled:—
Fruit fusiform ... 9. B. fusiformis.
Fruit, oblong truncate, boldly 4-angled ... 10. B. acutangula. Flowers sessile or nearly so; fruit sub-globose 11. B. spicata.

1. Barringtonia speciosa, Forst. Char. Gen. t. 38 and t. 38 A and B. A glabrous tree, 30 to 50 feet high; young branches stout, grey. Leaves thinly coriaceous, obovate-oblong or obovate, with broad rounded apex and much narrowed base, sessile, entire; main-nerves about 10 pairs, not prominent; length 6 to 14 in.; breadth 3.5 to 7 in. Panicles short (4 to 8 in. long) erect, terminal, with 1 or 2 leaf-like bracts at the base. few-flowered. Flowers 6 to 12, large (2.5 to 3 in. long and 5 in. in diam.), on long pedicels bracteolate at the base. Calyx with 2 large oblong, nerved (2 to 4 in.) lobes .75 to 1.25 in. long, persistent. Petals 4, white, larger than the calyx, (2.5 in. broad) deciduous. Stamens very numerous, longer than the petals but shorter than the style. Fruit large, shining, quadrangular-truncate at the base, tapering to the apex and crowned by the persistent calyx, bluntly 4-angled, sometimes subovoid and less prominently angled, 3 in. or more in breadth at the base and slightly more in length; pericarp very thick, fibrous, spongy. Seeds ovoid, 2 or more in, long. Flor. des Serres IV, 409; Linn. f. Suppl. 312; DC. Prodr. III, 288; Roxb. Fl. Ind. II, 636; Wall. Cat. 3632, excl. B; Blume Bijdr. 1096; W. & A. Prodr. 333; Wight Ic. t. 547; Mig. Fl. Ind. Bat. I, Pt. 1, 485; Miers in Trans. Linn. Soc. Ser. II, Bot. I, 55, t, 10; Kurz For. Fl. I, 496; Clarke in Hook. fil. Fl. Br. Ind. II, 507; Trimen Flora Ceylon II, 189. B. asiatica, Kurz in Journ. As. Soc. 1877, Pt. 2, 70. B. ? macrophylla, Mig. l.c. 491. Mammea asiatica, Linn. Sp. Pl. 731. Agasta splendida, asiatica and indica, Miers l.c. 60-64, tt. 11, 12. Butonica, Rumph Herb. Amb. III, t. 114.

In all the Provinces, on the sea-coasts: Distrib.—The shores of the Malay islands and British India; also of Australia and Polynesia.

The late Mr. Miers excluded from the genus Barringtonia everything except a plant now known by an imperfect specimen preserved in the Banksian collection and by Forster's drawings, which latter represent a 4-celled fruit. The plant here described to which Forster's name had, prior to the issue of Mr. Miers' monograph in the Linnæan Transactions, by common consent been given, is one of three forms of the plant on which Miers founded the genus Agasta. On characters largely based upon slight differences in the shape of the fruit, Miers distinguished his three species Agasta splendida, asiatica and indica. The latest writers on

Indian Botany who have dealt with the Indian Barringtonias (Mr. C. B. Clarke in Hooker's Flora of British India, and the late Dr. H. Trimen in his Flora of Cevlon) adopt the view that obtained prior to the publication of Miers' paper, and they believe that the three species of Agasta of the latter author are merely forms of the Barringtonia speciosa of Forster. If Miers' arrangement, however, is to be followed, the name of the plant occurring on the coasts of the Malay Peninsula and of British India would be either Agasta indica or A. asiatica according to the shape of the base of the fruit. Miers says of the fruit of the form which he considers alone entitled to the name Barringtonia speciosa, fructus non vidi, and he relies solely on Forster's figure (Char. Gen. t. 38 B, fig. b). In his account of it that figure no doubt shows a 4-celled fruit. Whether or not Forster or his artist had a fully-developed fruit before him when he made the drawing referred to cannot be known. But however that may be, the characters, other than the number of cells in the fruit of Forster's Barringtonia and of Miers' three Agastas are practically alike, and I fail to see any good basis for the foundation on them of four species belonging to two genera.

2. Barringtonia conoidea, Griff. Notul. 656. Ic. 635, 636, fig. 1. A large bush or small tree, glabrous; young branches sub-sulcate. Leaves thickly membranous, oblanceolate-elliptic or cuneate: oblong, narrowed at the minutely subcordate or rounded base to the short, stout petiole; the apex blunt or sub-acute; the edges obscurely crenateserrulate or subentire; main-nerves 9 to 13 pairs, curved, ascending; length 45 to 10 in.; breadth 2 to 4 in.; petiole 15 to 2 in. Racemes suberect, lateral or terminal, few-flowered, about 4 in. long, glabrous or puberulous. Flowers less than 1 in. long and 1 in. across, on pedicels ·5 to ·6 in. long. Calyx with a subcylindric tube, ·15 in. long; the base with 8 gibbous processes; the limb bipartite. Petals 4, fleshy, ovatelanceolate. Stamens much exceeding the corolla. Fruit fibrous-fleshy. conoid, produced at the base into 8 wing-like semi-cordate fleshy processes and crowned at the apex by the calyx, 2.5 in. long and 1.75 in. broad at the base. Kurz For. Flor. Burma I, 497; Clarke in Hook. fil. Fl. Br. Ind. II, 508. B. alata, Wall. Cat. 3633. Butonica alata, Miers in Trans. Linn. Soc. Ser. II, Bot. I, 70, t. 14, figs. 10 to 15.

MALACCA: Griffith (Kew Dist. 2423). PERAK: Scortechini 1385. BURMAH: Wallich.

At once distinguished by its curious conical fruit winged at the base.

3. Barringtonia racemosa, Roxb. Hort. Beng. 52; Fl. Br. Ind. II, 634. A glabrous tree, often 50 feet high; young branches rather stout, cinereous. Leaves membranous, oblong-obovate or oblanceolate, shortly acuminate, narrowed to the shortly petiolate base, faintly crenate-denticulate; main-nerves 8 to 15 pairs, spreading or ascending, thin but prominent on the lower surface when dry; length 4 to 12 in.; breadth 2 to 4 in.; petiole 1 to 25 in. Racemes much longer than the leaves, (10 to 24 in. long) from the axils of fallen leaves or terminal,

pendulous, many-flowered, minutely bracteolate. Flowers distant, 1.5 to 2 in. in diam., on thin pedicels 2 to 3 in. long, buds globose. Calux turbinate, obconic, 2- or 3-partite, permanent. Petals 4, oblong. Stamens very numerous, much longer than the calvx but shorter than the style. Fruit as large as a hen's egg and of much the same shape, but somewhat 4-sided, nearly smooth, the pericarp leathery; seed solitary ovate-oblong. DC. Prodr. III, 288; Wall. Cat. 3634; W. & A. Prodr. 333; Wight Ic. t. 152, including fruit; Bot. Mag. t. 3831; Dalz. & Gibs. Bomb. Fl. 94; Gand. Voy. Freyc. t. 107; Vidal, F. Fl. Fil., t. 50a; Kurz For. Fl. I, 496; Clarke in Hook. fil. Fl. Br. Ind. II, 507; Trimen Flora Ceyl. II, 189. B. speciosa, Wall. Cat. 3632 B. B. alba, Mig. Fl. Ind. Bat. I, Pt. 1, 487. Eugenia racemosa, Linn. Sp. Pl. 673. Stravidium album, DC. Prodr. III, 289. Butonica racemosa and alba, Miers in Trans. Linn. Soc. Ser. II, Bot. I, 65, 66, t. 13, figs. 1-17. B. rubra and inclyta, Miers l.c. 70, 71, t. 14, figs. 1-3, 19.—Rheede Hort. Mal. IV, t. 6.

In all the provinces; on the sea shores. DISTRIB.—Brit. India, Malayan Archipelago, Polynesia.

4. Barringtonia pauciflora, King n. sp. A tree, 30 or 40 feet high; young branches slender, glabrous, pale-brown when dry. Leaves thickly membranous, broadly oblanceolate narrowed into the petiole at the base; the apex suddenly and shortly caudate-acuminate; mainnerves 8 to 10 pairs, curving upwards; length 3 to 4.5 in.; breadth 1.25 to 2 in.; petiole 4 to 8 in., slender. Raceme solitary, terminal, erect, 1.5 to 2 in. long, bearing only 2 or 3 flowers or sometimes only a single one. Flowers about 1.75 in. long. Calyx-tube funnel-shaped, boldly 4-angled, sparsely rufous-furfuraceous, 4 in. long; the lobes 4, ovate-rotund, blunt, shorter than the tube. Petals 4, obovate-oblong, glabrous, 1 in. long. Stamens longer than the petals. Fruit unknown.

PERAK: Scortechini 939; King's Collector 6355.

5. Barringtonia macrostachya, Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 71; For. Flora Burma II, 498. A glabrous shrub or small tree; young branches pale-brown, striate. Leaves oblong-oblanceolate or oblong-elliptic, narrowed to the long sleuder petiole, the apex abruptly acuminate, the edges entire or with broad shallow crenations; main-nerves 14 to 18 pairs, curved, ascending, rather prominent beneath when dry; length 5 to 12 in.; breadth 2 to 5 in.; petiole 1 to 4.5 in. Spikes lateral (often extra-axillary) or terminal, pendulous, 1 to 2 feet long, glabrous or puberulous, stout, rather fleshy and much thickened in the fruiting stage; bracteoles minute, caducous. Flowers sessile, crowded, nearly 2 inches long and 1 in. across when expanded. Calyxtube obconic, 4-angled, 25 in. long; the limb with 4 broad, blunt lobes

2 in. long. Petals oblong sub-acute, 1 in. long. Filaments twice as long as the petals. Fruit broadly-ovoid or elliptic, smooth, not angled or only slightly so, crowned by the small calyx-lobes, 1.5 to 2 in. long and about 1.35 in. in diam. Clarke in Hook, fil. Fl. Br. Ind. II, 509 (excl. syn. B. pendula, Kurz and Doxomma pendula, Miers). B. cylindrostachya, Griff. Notul. IV, 655. B. sarcostachys, Miq. Fl. Ind. Bat. I, Pt. I, 490. Stravidium sarcostachys, Blume in Van Houtte Fl. des Serres, VII, 24. S. acuminatum, Wall. Cat. 3636. Doxomma macrostachyum, cylindrostachyum, acuminatum, Miers in Trans. Linn. Soc., Scr. II, Bot. I, 104, 100, 102. Gareya macrostachya, Jack in Mal. Misc. I, 47; DC. Prodr. III, 295.

MALACCA: Maingay (K.D. 763); Griffith (K.D. 2421): PENANG: Curtis 1581. NEGRI SEMBILAN: Ridley 1852. PERAK > Scortechini (without No.); Wray 1299, 2410, 3136, 3642, 3635; King's Collector 3402, 3779, 4136, 10075, 10206, 10615. DISTRIB.—Borneo, Burmah, Griffith; Gallatty.

This is allied to *B. pendula*, Kurz—a rare species from Southern Burma originally described by Griffith as *Careya pendula* (Notulæ IV, 661). That species, however, has narrower leaves than this with fewer nerves; the calyx-tube is elongate, the stamens are only about one inch long; and the fruit is narrowly oblong, boldly 4-angled, more than 2 in. long and only about 65 in. in diam. There is an excellent drawing of this plant with full analyses of the flowers in the Herb. Kew, which was made from living specimens by the Rev. C. Parish. The species has been reduced in Hooker's Flora of British India to *B. macrostachya* from which it differs in the points above noted.

6. Barringtonia Scortechini, King n. sp. A glabrous tree, 50 to 60 feet high; young branches slender, pale-brown, glabrous. Leaves thinly coriaceous, elliptic-oblong to oblanceolate-oblong, tapering (often very much) to the petiole; the apex acute or shortly acuminate; the margins entire or obscurely and minutely dentate; main-nerves 6 or 7 pairs, spreading, curved; length 3 to 6.5 in.; breadth 1.5 to 2.5 in.; petiole 5 to 8 in. Spikes lateral, pendulous, 6 to 18 in. long, glabrous, rather slender but slightly thickening with age. Flowers numerous, 1.5 to 2 in. long, narrow. Calyx-tube bracteate at the base, glabrous, obconic, 4-angled, 25 in. long; the 4 lobes shorter than the tube, broad, rounded. Petals oblong, blunt, 75 in. long. Filaments 1.5 to 2 in. long. Ovary 3-celled (usually). Fruit oblong, somewhat tapered but truncate at each end: the apex mamillate crowned by the small calyx-lobes, smooth, 3 in. long and 1 in. diam.

Perak: Scortechini 237, 395, 1674, 2020; Wray 2087; King's Collector 3598, 3854, 6252; Curtis 1296.

There are two distinct forms under this species; one with oblong-elliptic 568

leaves and rather larger flowers; the other with leaves oblanceolate, more slender spike-rachis and smaller flowers, but the two pass into each other.

7. BARRINGTONIA SUMATRANA, Miq. Fl. Ind. Bat. Suppl. 315. A glabrous tree; young branches pale, as thick as a goose-quill. Leaves coriaceous, elliptic or oblong-elliptic tapering much to the base, the apex shortly and rather abruptly acuminate, the edges obscurely serrate or entire, slightly wavy somewhat recurved when dry; upper surface shining when dry, the lower dull and paler, both minutely reticulate; main-nerves 9 to 12 pairs, thin but prominent; length 4.5 to 7.5 in.; breadth 1.4 to 3 in.; petiole .75 to 2 in., thickened at the base. Spikes axillary and terminal, pendulous, angled, glabrous, 9 to 15 in. long, not thickening in fruit. Flowers numerous, more than 1 in. long and nearly as much across, sessile. Calyx 5 in. long; the tube infundibuliform acutely 4-angled; the lobes half as long as the tube, broadly ovate, concave, spreading. Petals broadly oblong, very blunt, 65 in. long. Stamens \*75 in. long or more. Style slender, 1.6 in. long. Fruit oblong, somewhat tapered to the base, less so to the calyx-crowned apex, acutely 4-angled, smooth and shining, 1.75 in. long, and .65 in. in diam.

SINGAPORE: Ridley 277, 2056. SUMATRA: Miquel (Herb. Bogor 4536). Celebes: Beccari.

8. BARRINGTONIA MUSIFORMIS, King n. sp. A large tree, 60 to 80 feet high; young branches as thick as the fore finger, brownish, glabrous. Leaves thinly coriaceous, entire, or obscurely crenate towards the apex, oblong-oblanceolate or narrowly elliptic-oblong, much tapered to the long slender petiole, the apex shortly acuminate; main-nerves 8 to 12 pairs, curved, ascending, not conspicuous; length 5 to 10 in.; breadth 1.75 to 3.25 in.; petiole .75 to 2.25 in. thickened at the base. Spikes axillary, subcreet, 12 to 14 in. long, stout, striate, thickening to .6 in. in diameter or more in fruit, the cicatrices of the fallen flowers very prominent, scurfy-puberulous. Flowers large, sessile. Calyx campanulate, 1.25 in. in diam. at the mouth, densely but minutely rusty-pubescent; the tube subcylindric, only 2 in. long; the 4 lobes large, ovaterotund, blunt, '75 in. long. Petals 4, concave, rotund, scurfy outside. Fruit narrowly-oblong, 4-angled, sub-truncate at each end, the upper crowned by the calyx and the 2 inch long style, minutely pubescent, 4 or 5 in, long, and 1 to 1.5 in, thick.

PERAK: King's Collector 5746, 6154.

I have seen no expanded flowers of this as the collected specimens are either in bud or in fruit. Its nearest allies are B. augusta, Kurz, B. pterocarpa, Kurz, and Doromma magnificum Miers, but all these have much smaller flowers and their leaf petioles are very short. The ripe fruit of this resembles in shape a small banana, but the endocarp and pericarp have a very different texture, being in this densely fibrous.

9. BARRINGTONIA FUSIFORMIS, King n. sp. A small tree, 10 to 20 feet high; young branches slender, puberulous, pale when dry. Leaves membranous, oblanceolate or obovate-oblong, narrowed to the cordate base, sessile or sub-sessile; the apex obtuse or acute; the edges remotely serrate becoming almost entire when old; main-nerves 12 to 16 pairs, curved, ascending, slightly prominent on the lower surface when dry; length 4 to 8 in.; breadth 1.4 to 2.4 in.; petiole (if present) only 05 in. long. Racemes axillary, very slender, pendulous, much exceeding the leaves, lax, minutely rusty-pubescent, 1 to 2 feet long, surrounded at the base by a whorl of lanceolate persistent bracts 5 in. long. Flowers 4 in. across, distant, on slender pedicels 1 in. long; the bracteole at the base of each pedicel lanceolate, deciduous. Calya 3 in. long; the tube obconic, densely rusty-puberulous; the teeth 4, broad, rounded, less puberulous than the tube. Petals slightly longer than the calvx, broadly obovate. Stamens three times as long as the petals. Fruit fusiform, tapering almost equally to each end; the apex crowned by the small calyx, 4-angled, deciduously rusty-pubescent, 2.25 in. long and only 5 in. in diam.

PERAK: Scortechini; King's Collector 10388, 10643, 10094.

The very long flower pedicels and the narrowly fusiform fruit distinguish this from all the other species.

10. Barringtonia acutangula, Gærtn. Fruct. II, 97, t. 101. A glabrous tree, 25 to 50 feet high; young branches thin, pale-grey, glabrous. Leaves obovate-oblong, or cuneate-elliptic, much narrowed to the shortly petiolate base, the apex broad rounded or subacute, the edges minutely denticulate or cuneate: main-nerves 10 to 13 pairs, spreading, not prominent; length 2 to 5 in.; breadth 1.1 to 2 in.; petiole 15 to 2 in. Racemes much exceeding the leaves, slender, pendulous, many-flowered, from 6 to 15 in. long. Flowers 3 or 4 in. across, in slender pedicels from '05 to '25 in. long. Calyx with short tube and 4 rounded, regular. ciliate teeth. Petals small, under 25 in. long. Filaments about three times as long. Fruit oblong or oblong-ovoid, truncate at both ends. crowned by the small calyx, glabrous, boldly but bluntly quadrangular, 1.25 to 1.5 in. long. Roxb. Fl. Ind. II. 635; Blume Bijdr. 1097; W. & A. Prodr. 333; Miq. Fl. Ind. Bat. I, Pt. 1, 488; Dalz. & Gibs. Bomb. Fl. 95; Bedd. Fl. Sylv. t. 204; Brand. For. Fl. 235; Kurz For. Fl. Burm. I, 497; Clarke in Hook. fil. Fl. Br. Ind. II, 508; Trimen Flora Ceylon II, 191. Stravidium rubrum, DC. l.c. 289. S. acutangulum, Miers in Trans. Linn. Soc. Ser. II, Bot. I, 80 t. 17 figs. 1 to 14. S. obtusangulum and S. Rheedii, Blume in Van Houtte Flore des Serres VII, 24; Miers l.c. Eugenia acutangula, Linn. Sp. Pl. 673.

I include this species as Malayan with some hesitation. Most of the Malayan 570

specimens bearing the name I would refer to *B. spicata*, Bl. It is however a widely distributed and common tree in India and particularly so in Burma and it is quite likely to occur in Quedah and the northern part of Perak.

11. BARRINGTONIA SPICATA, Blume Bijdr. 1097. A tree, 30 or 40 feet high; young branches slender, smooth, brown when dry. Leaves oblongoblanceolate, tapering to the short petiole, the apex acute or subacute, the edges distinctly serrate-dentate; main-nerves 8 to 10 pairs, curving slightly, ascending; length 4 to 8 in.; breadth 1.4 to 2.4 in.; petiole 2 to 3 in. Spikes axillary or terminal, exceeding the leaves, very slender, pendulous; bracteoles minute, caducous. Flowers small, numerous but not crowded, sessile or with a very short pedicel, about ·5 in. in diameter when expanded. Calyx with obconic, rusty-pubescent tube less than 1 in. long, and 4 broad, rounded teeth half as long. Stamens 5 in. long. Fruit sub-globose, glabrous, crowned by the enlarged calyx-lobes, about '6 in. in diam. Miq. Fl. Ind. Bat. I, Pt. 1, 489; Vriese Ned. Kruidk. Arch. III, 41. Stravidium spicatum, DC. Prodr. III. 289: Blume in Van Houtte Flore des Serres VII. 24. S. spicatum and globosum, Miers in Trans. Linn. Soc. Ser. II, Bot. 1, 85. Gustavia globosa, Span. Trans. Linn. Soc. XV, 204. ? Stravidium denussum, pubescens, reticulatum, Horsfieldii and serratum, Miers l.c. 81 to 86. ?S. coccineum, DC. Prodr. III, 289; Miers l.c.

MALACCA: Griffith (K.D.) 2425; Derry 1221; Maingay (K.D.) 765.

Penang: Curtis 397. Trang: King's Collector 1404. Perak: King's Collector 4681. Province Wellesley: Ridley 7043. Distrib.—Java, Borneo; Motley 537, 582; Zollinger Cat. 534.

This resembles *B. acutangula*, Gærtn., but differs in having sessile flowers, shorter stamens, and sub-globose not elongated angular fruit. The leaves also are less obovate. It is a widely distributed species and therefore presents various forms, many of which have been treated as species.

## 11. PLANCHONIA, Blume.

Trees with alternate, membranous, crenulate, pinnately-nerved leaves without dots, crowded towards the ends of the branches. Flowers white or yellowish-green, in short terminal racemes. Calyx-tube turbinate, little produced beyond the ovary; its mouth with 4 imbricate lobes. Petals 4, imbricate. Stamens very numerous, in several series, slightly united at the base into a ring, the inner without anthers, the filaments of all long and slender. Ovary inferior, 3-4-celled, crowned by an annular disc. Style 1, long, slender, crowned by the small stigma; ovules many in each cell. Fruit large, fibrous, ovoid, crowned by the persistent calyx-lobes, 1-3-celled. Seeds several, ellipsoid, the testa coriaceous, albumen absent, cotyledons short. Distrib.—Three species; littoral, from the Andaman islands to Australia.

Leaves obovate, distinctly crenulate; flowers sessile ... 1. P. sundiaca.

Leaves broadly elliptic, obscurely crenulate; flowers on long pedicels ... ... 2. P. andamanica.

1. PLANCHONIA SUNDIACA, Miq. A tree, 50 feet high; young branches thicker than a goose-quill, the bark rough, pale-brown. Leaves distinctly crenulate, obovate, much and gradually narrowed into the petiole; the apex with a short triangular apiculus; both surfaces brown (when dry), the reticulations faint: main-nerves 12 to 18 pairs, spreading, depressed on the upper prominent and often pale in colour on the lower surface; length 3 to 65 in.; breadth 1.75 to 3 in.; petiole 3 to 6 in. Racemes 2 in. long, few-flowered. Flowers white with pink towards the centre, about 1.5 in. long, sessile. Calyx-tube 6 or 7 in. long, campanulate, ribbed below: the lobes oblong, broad, subacute. Petals narrowly oblong, acute, longer than the calyx and about as long as the stamens. Fruit (unripe) broadly oblong-ovoid.

Perak: Wray 2366; King's Collector 7096. Distrib.—Sumatra, Forbes 3254.

2. PLANCHONIA ANDAMANICA, King n. sp. A tree; young branches as thick as a goose-quill, pale-brown, smooth. Leaves broadly elliptic or elliptic-rotund, slightly and abruptly tapered into the narrowly winged petiole, the apex with a short triangular acumen, the edges indistinctly crenulate; upper surface olivaceous-brown, the lower pale-brown, not olivaceous; main-nerves 10 to 12 pairs, spreading, dark on the upper and pale on the lower surface but not very bold on either, length 5 to 7 in.; breadth 3 to 4 in.; petioles 6 to 8 in. Racemes 3 or 4 in. long; the flowers about 2 in. long on stalks 1 to 2 in. long. Calyar 8 or 9 in. long, campanulate, its lobes large, elliptic-rotund, obtuse. Petals broadly elliptic, very obtuse. Fruit unknown.

Andaman Islands: King's Collector.

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## MATERIALS

FOR A

## FLORA OF THE MALAYAN PENINSULA

BY

SIR GEORGE KING, K.C.I.E., M.B., LL.D., F.R.S., LATE SUPERINTENDENT OF THE ROYAL BOTANIC GARDEN, CALCUTTA.

[Reprinted from the "Journal, Asiatic Society of Bengal," Vol. LXXI

Part II, No. 2, 1902.]

No. 13.

CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS. 1902.

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From the Journal, Asiatic Society of Bengal, Vol. LXXI, Part II, No. 1, 1902.

III.—Materials for a Flora of the Malayan Peninsula.—By Sir George King, K.C.I.E., M.B., LL.D., F.R.S., &c., late Superintendent of the Royal Botanic Garden, Calcutta.

#### No. 13.

The present contribution carries these Materials to the end of the Calycifloræ. The orders included in it are Datiscacæ, Droseracæ, Passifloracæ, Begoniacæ, Ficcideæ, Umbelliferæ, and Cornaceæ. It has not been possible for me to prepare my account of the Calycifloral orders in the exact sequence followed in Hooker's Flora of British India; each order, however, bears the ordinal number given to it in that work. The species described in the present paper are 47 in number, and of these fourteen belonging to the genus Begonia, and two belonging to Mastixia, are new to science. I hope in future contributions to take up the orders belonging to the groups Corollifloræ and Incompletæ.

#### Order LXVII. DATISCACEÆ.

Trees or herbs. Leaves petioled, simple or pinnate; stipules 0. Flowers small, dioccious in the Indian species, clustered, racemed or panicled. Male: calyx-tube short, teeth 3-9; petals 0; stamens 4-25. Female: calyx-tube adnate to the ovary, lobes 3-8 short; petals 0; ovary 1-celled, open or closed at the vertex; styles lateral, alternating with as many parietal placentæ, simple or 2-partite; ovules very many, ascending or horizontal. Capsule coriaceous or membranous, opening at the vertex between the styles. Seeds very many, small, albuminous; embryo straight, radicle next the hilum.—Distrib. Species 4; natives of the Mediterranean, Central Asia, Java, and North-West America.

## TETRAMELES, R. Br.

A large tree. Leaves petioled, ovate, pubescent beneath at least on the nerves. Flowers directors, appearing before the leaves; males panicled, females in elongate racemes, clustered near the ends of the branchlets. Male: calyx-lobes short; teeth 4, ovate, one or two smaller teeth sometimes added; petals 0; stamens 4, opposite the calyx-teeth, inserted round a depressed disc; rudiment of the ovary 0 or quadrangular. Female: calyx-tube ovoid; teeth 4 short; petals 0; styles 4, short, stigmas simple somewhat club-shaped. Capsule ovoid, with 4 lines or slight ridges, membranous, opening at the top between the styles. Seeds very many, minute, flattened, ellipsoid, testa very lax and extending much beyond the nucleus as a loose membrane.

1. T. NUDIFLORA, R. Br. in Benn. Pl. Jav. Rar. 79, t. 17; A.DC. Prodr. XV. pt I. 411; Bedd. Fl. Sylv. t. 212; Brand. For. Fl. 245: Kurz For. Fl. 535; Clarke in Hook. f., Flor. Brit. Ind. II, 657. T. Grahamiania, Wight Ic. t. 1956; A.DC. l. c. T. rufinervis, Miq. Fl. Ind. Bat. I. pt. I. 726; A.DC. l.c. Anictoclea Graham-iana, Nimmo in Grah. Cat. Bomb. Pl. 252.—Indeterminata, Wall. Cat. 9045.

Andaman Islands; Kurz.—Distrib. Eastern Himālaya, Burma and Java.

#### Order LIV. DROSERACEÆ.

Herbs with large glandular hairs, exuding a viscid fluid. Flowers hermaphrodite, regular. Petals 5 hypogynous, rarely perigynous, thin, nerved, imbricate, marcescent, free or slightly united. Stamens 4 to 20, hypogynous or slightly perigynous; filaments free or slightly monadelphous, subulate or filiform: anthers 2-celled; disc none. Ovary free or adherent by its base to the calyx, globose or ovoid, 1-celled; styles 5, sometimes 3, simple or bifid; stigmas capitate; placentas parietal, equal in number to the styles; ovules and seeds numerous. Capsule membranous, 1-to 5-celled. Seeds with fleshy albumen; embryo cylindric or minute.—Distric. Species about 100; in temperate and tropical regions generally, but absent from the Pacific Islands.

## DROSERA, Linn.

Small perennial herbs. Leaves radical and rosulate, or cauline and alternate, bearing many large glandular viscid hairs, usually circinate in vernation, with scarious stipules adnate to the petiole, or exstipulate. Calyx persistent, free from the ovary, 4-to 8-partite or sepals free. Petals 4 to 8, hypogynous or very slightly perigynous, marcescent. Stamens equal in number to the petals, hypogynous or slightly perigynous. Ovary 1-celled; styles 2 to 5; ovules parietal, numerous. Capsule loculicidally 2-to 5-valved. Seeds numerous, obovoid-ellipsoid (in the Indian species); testa black, smooth, reticulate.—Distrib. Species about 90, cosmopolitan, but absent in Polynesia; Australia.

Leaves cuneate-spathulate, all radical ... ... 1 D. Burmanni.

Leaves peltate-lunate with long narrow petioles, some radical the others cauline ... ... 2 D. peltata.

Leaves linear, all cauline ... ... 3 D. indica.

1. Drosera Burmanni, Vahl Symb. III, 50. Leaves all radical, rosulate, cuneate-spathulate, 5 to 15 in. long, stipules half as long as the petiole. Peduncles erect, 3 to 8 inches high, naked, glabrous. Flowers racemose, their pedicels glabrous, erect in fruit; calyx minutely papillose: styles 5, simple. Don, Prod. Fl. Nep. 212; DC. Prod. I, 318; Roxb. Fl. Ind., II, 113; Wall. Cat. 1242; Wight, Ill. t. 20; Wight, Ic.

944; W. & A. Prod. Fl. Penins. Ind. 34; Planch. in Ann. Sc. Nat. Ser. III. Vol. IX, 190; Miq. Fl. Ind. Bat., Vol. 1, pt. II, 120; Suppl. 160; Hf. & Th. in Journ. Linn. Soc. II., 82; Dalz. & Gibs. Fl. Bomb., 12; Kurz in Journ., As. Soc., Beng., 1876, pt. II, 310; Clarke in Hook. fil. Fl. Br. Ind. II, 424; Trimen, Fl. Ceyl. pt. II, 145.

Malacca: Province Wellesley, and probably in the other provinces.—Distrib. British India, Ceylon, the Malay Archipelago, China, Japan Africa, Australia, up to elevations of 8,000 feet.

2. DROSERA PELITATA, Sm. ex Willd. Sp. Pl. I, 1546. Stem erect, leafy, 3 to 12 in. high, simple or branched near the apex. Leaves subrosulate, also scattered and alternate on the stem, peltate-lunate, with very long glandular hairs, '2 to '25 in. broad (including the radiating hairs); the petiole much longer than the laminæ, very slender. Racemed 1 to 3 in. long, terminal or sub-terminal; flower-pedicels '35 to '75 in. long, glabrous. Sepals ovate, glabrous, erose or fimbrirate. Styles 3, fimbriate. Seeds as in D. indica, III. DC. Prod. I, 319; Sm. Exot. Bot., I, 41; Don Prod. Fl. Nep., 212; Wight. t., 20; W. & A. Prod. Fl. Penins. Ind., I, 34; Planch. in Ann. Sc. Nat. Ser. III, Vol. IX, 296; Kurz in Journ. As. Soc. Beng., 1876, pt. 2, 310; Clarke in Hook. fil. Fl. Br. Ind., II, 424; Trimen, Fl. Ceyl. pt. II, 146. D. lunata, Ham.: DC. Prod. I, 319; Wall. Cat., 1243; Hook. Ic. Pl. 54; Planchon l.c., 296; Miq. Fl. Ind. Bat., II, Pt. 2, 120. D. lunata, gracilis et D. foliosa, Hook. fil. Journ. Linn. Soc., II, 82; 297, 298. D. Lobbiana Turcz. (fide Kurz).

Malacca, Singapore, and probably in some of the other provinces.— Distrib. Malay Archipelago, British India, and Australia.

3. Drosera indica, Linn. Sp. Pl. 282. Stem 2 to 12 in. long, decumbent, usually simple. Leaves alternate, scattered, I to 3 in. long, linear, not much broader than the glabrous petiole, very glandular-pubescent. Racemes 2 to 6 in. long, leaf-opposed; flower-pedicels :35 to :75 in. long, rusty-pubescent. Sepals lanceolate, minutely glandulose or sub-glabrous. Styles 3, bifid to the base. Seeds obovoid, much reticulate not scrobiculate. DC. Prod., I, 319; Roxb. Fl. Ind., II, 113; Wall. Cat., 1244; Wight Ill. t., 20; W. & A. Prod. Fl. Penins. Ind., 34: Planch. in Ann. Sc. Nat. Ser., III, Vol. IX, 209; Miq. Fl. Ind. Bat., Vol. I, Pt. 2, 120; Hf. & Th. in Journ. Linn. Soc. II, 82; Dalz. & Gibs. Fl. Bomb., 12; Kurz in Journ. As. Soc. Beng., 1876, Pt. II, 310; Trimen Fl. Ceyl., Pt. II, 146; Clarke in Hook. fil. Fl. Br. Ind., II, 424. D. Finlaysoniana, Wall. Cat., 3752. D. serpens, Planch. 1.c., 204.—Rheede, Hort. Malab., X, t. 20.

MALACCA: Province Wellesley, and probably in the other provinces.—Distrib. British India, Ceylon, Malayan Archipelago, tropical Australia, and Africa.

#### Order LI. PASSIFLOREÆ.

Twining herbs or shrubs, rarely erect. Leaves alternate, stipulate, entire or lobed, penni- or palmi-nerved, frequently glandular beneath. Petiole usually bearing glands. Stipules foliaceous or minute, Tendrils axillary or O. Inflorescence axillary, cymose, sometimes with one or more branches cirrhose, rarely flowers solitary. Bracteoles 3, minute and scattered, or foliaceous and forming an epicalyx, rarely 0. Flowers regular, unisexual, or bisexual. Calyx tubular at the base, fleshy, subcoriaceous or membranous; segments imbricate, 5. Petals 0 or as many as the calyx-lobes, springing from the tube of the calyx, membranous or fleshy, imbricate, marcescent. Corona of one or more rows, filamentous or membranous or both, arising from various portions of the calvxtube, rarely 0; basilar corona urceolate or cup-shaped, surrounding the base of the andrecium, sometimes represented by five separate glands of the disc; rarely 0. Stamens 5, in a tube or free to the base, perigyuous; anthers oblong, 2-celled, basi- or dorsi-fixed, dehiscing laterally or introsely. Ovary superior, on a gynophore or subsessile, 1-celled with 3 parietal placentas, rudimentary or absent in the male flowers. 1 or 3; stigmas reniform, capitate or flattened. Ovules numerous, pendulous, anatropus; funicle expanded into a cup-shaped arillus. baccate or capsular. Seeds numerous, ovoid or flattened, often pitted, covered with a fleshy arillus; albumen fleshy, rarely scanty; embryo straight, cotyledons flat leafy, radicle short terete.—DISTRIB.: Chiefly tropical; most numerous in South America. Genera about 18; species about 320.

Erect shrubs, without tendrils ... ... 1 Paropsia.

Scandent, with tendrils:—

Fruit pulpy, indehiscent; flowers large ... 2 Passiflora.

Fruit dehiscent; flowers small ... 3 Adenia.

## 1. PAROPSIA, Noronh.

Shrubs. Leaves simple. Flowers in dense axillary cymes. Calyxtube short; limb 5-parted. Petals 5, springing from the base of the calyx-tube. Corona of fine threads springing from the tube of the calyx and more or less divided into five phalanges. Gynophore short; filaments flat; anthers oblong. Ovary subglobose. Slyle short, dividing into three branches: stigmas reniform-capitate. Fruit capsular.—Distrib. Species 4 or ., atives of tropical Africa and Malaya.

P. VARECIFORMIS, Mast. in Trans. Linn. Soc., XXVII, 639. A shrub or small tree. *Leaves* subcoriaceous, oblong or oblong-lanceolate, acute or shortly acuminate, the base cuneate, the edges entire or (rarely) minutely serrate; both surfaces glabrous except the glandular puberulous

midrib and nerves; the lower with numerous minute adpressed scales; main 6 or 7 pairs spreading, curved; length 2.5 to 5.25 in., breadth 1 to 1.75 in., petiole 1 to 2in. Flowers about 5 in. in diam., on short, rusty-tomentose pedicels 15 in. long. Calyx campanulate, leathery, adpressed-villose outside like the pedicels, the lobes much longer than the tube, unequal, oblong, subacute. Petals oblanceolate, smaller than the calyx-lobes. Corona single, very short, lanate, in 5 phalanges. Stamens 5. Gynophore shorter than the corona; ovary villose. Fruit ovoid or sub-globose, 5 to 7 in. across. Masters in Fl. Br. Ind., II, 600. P. malayana, Planch. ex Masters 1.c. Trichodia vareciformis, Griff. Notul., IV, 571.

MALACCA: Griffith, Manigay, and others. Perak: Scortechini, King's Collector; a common plant.

I can find no constant characters to separate the two species into which this plant has been divided in the Flora of British India and therefore unite them under the oldest specific name.

### 2. Passiflora, Linn.

Twining shrubs. Leaves simple or palmilobed, usually with glands on the under surface and on the petiole; stipules thread-like or leafy. Flowers pedunculate; often involucrate; peduncles simple or cymose. Bracteoles 3, small, scattered. Calyx-tube fleshy, limb 5-lobed. Petals 5, springing from the throat of the calyx. Corona of one or more rows of fine threads springing from the throat of the calyx-tube and of one or more membranous folds arising lower down. Gynophore surrounded at the base by a shallow membranous cup or basilar corona; filaments 5, flat; anthers oblong, 2-celled, dorsifixed; pollen-grains reticulate on the surface. Ovary 1-celled; styles 3, stigmas reniform-capitate. Fruit baccate. Seeds arillate.—Distrib. A genus of about 250 species which are most numerous in tropical and sub-tropical America.

Passiflora Horsfield, Blume, Rumphia, I, 170, t. 52. A slender climber; young branches slightly quadrangular, slender, striate, almost glabrous. Leaves membranous, oval or oblong-ovate, subacute sometimes retuse, the base rounded and minutely emarginate; upper surface pale-brown when dry, shining, glabrous, minutely reticulate; lower surface when young sometimes with sparse deciduous hairs, but more usually glabrous from the first, always dull and whitish and with a few flat dark-coloured glands, the transverse veins and reticulations very distinct; main-nerves about 5 pairs, ascending, faint; length 4 to 6 in.; breadth 2·5 to 3·25 in.; petiole 6 to 9 in., with two oval flat glands near its middle. Inflorescence shorter than the leaves, axillary, about 5-flowered, the flowers 1·25 to 1·5 in. in diam., on slender long pedicels, white tinged with green; corona double, the outer with long erect

filamentous segments; the inner about one-fourth as long, its segments few, lanceolate, incurved. Stamens 5; the filaments spreading, clavate; anthers dorsifixed, oblong. Ovary ovoid, hirsute, the gynophore nearly as long as the outer corona; styles long, recurved. Fruit subglobular, '75 in. in diam. Disemma Horsfieldii, Miq., Fl. Ind. Bat., I, Pt. 1, 700.

Perak; Scortechini 655, 2,192; King's Collector 3,078, 4,104, 5,936, Distrib.—Java and Madura.

This is apparently the only species really indigenous in the Malayan Peninsula. There are, however, four American species which have escaped from cultivation. These are:—

P. suberosa, L. A small species with diversely shaped leaves, flowers little more than half-an-inch in diameter and ovoid fruits about the same in length.

P. foetida, L. A species with variable leaves, emarginate at the base, often 3-lobed; recognisable at once by its foetid flowers and 3-leaved fimbriate involucre.

P. edulis, Sims. With deeply 3-lobed serrate leaves, flowers more than an inch across; and globular edible fruit. This is often cultivated under the name of Granadilla.

P. quadrangularis, L. A large species with boldly 4-angled stems; handsome fragrant, purple flowers banded with white, 3 to 5 in. across; broadly ovate leaves and large oblique ovate-oblong stipules.

P. laurifolia, L. A more slender species than the last and with smaller flowers of similar colour, with a large 3-leaved or 3-partite involuces of broad segments, and of long filiform stipules; the leaves broadly oblong, entire and shortly apiculate.

### 3. ADENIA, Försk.

Scandent. Leaves entire or palmilobed, usually with two or more flat circular glands on the under surface and with similar glands at the apex of the petiole. Cymes axillary, few or many-flowered, on long peduncles, one or more of which is sterile and tendril-like. MALE FLOWER: Calyx tubular or bell-shaped; limb 5-lobed, lobes leathery, imbricate. Petals 5, free, membranous, 1-nerved, springing from the calyx-tube. Corona a ring of threads arising from near the base of the calyx-tube, or wanting. Glands of the disc 5, opposite the sepals, strap-shaped or capitate. Andræcium cup-shaped, membranous beneath; filaments 5, linear-subulate; anthers linear-oblong, 2-celled. Ovary rudimentary or O. Female flower: Calyx and corolla as in the male. Corona a membranous fold, springing from near the base of the calyx-tube, or none. Glands of the disc 5, strap-shaped, capitate, opposite the sepals. Staminodes 5, forming a membranous cup surrounding the base of the ovary, above dividing into barren filaments. Ovary globose or elliptic, sessile or stalked; style cylindrical or none; stigmas 3, capitate or flat and dilated. Fruit capsular, 3-valved. Seeds numerous, attached by long funicles to parietal placentas. - DISTRIB. About 40 species, natives of the tropics of the Old World.

Note.—The name used for this genus in Hooker's Flora of British India is *Modecca*, Lamk. which dates from 1797. Following Engler, I have here used Förskal's name Adenia, which dates from 1775.

Leaves always deeply 3-lobed ... ... 1 A. trilobata.

Leaves entire:—

Leaves minutely peltate at the base; lobes of calyx long, narrow and reflexed ... ... 2 A. nicobarica.

Leaves cordate at the base:-

Base broadly and deeply cordate, main-nerves radiating from the base: flowering peduncles up to 6 in. long ... ... 3 A. cardiophylla. Base slightly cordate: main-nerves pinnate: 4 A. populifolia v.

flowering peduncles less than 2 in. long ... pentamera.

Leaves not cordate at the base or only occasionally very slightly so: main-nerves usually 2 sometimes 3 pairs:—

Nerves and reticulations of leaves distinct
...

5 A. acuminata.

Nerves and reticulations of leaves invisible, the lower surface of the leaves whitish ... ...

... 6 A. singaporeana.

1. Adenia trilobata, Engl. Jahrb., XIV, 375. Many feet in length, glabrous, the bark on the old shoots cinereous, on the young smooth green. Leaves remote, membranous, broadly cordate at the base, deeply 3-lobed; the lobes lanceolate, the two outer often auriculate at the base, the sinuses wide, rounded, and each bearing a small gland; mainnerves 5, palmate; the lateral nerves and the reticulations few; length 6 to 9 in.; width 4.5 to 6.5 in.; petioles from half as long to nearly as long as the leaf-blades, terete, smooth, not enlarged at the base, the anex with two conical recurved glands. Peduncles slender, smooth, terete, axillary, longer than the petioles, umbellulately cymose; flowers few, ·3 to ·5 in. long, the females somewhat longer than the males. Calyx tubular, the lobes short, oblong, subacute. Petals narrowly oblong, inserted near the base of the calyx-tube. Filuments united into a tube springing from the fundus of the calyx; anthers linear-oblong, abruptly acute, the connective produced into a minute point. Glands narrowly oblong, blunt, incurved. Staminodes in female flower united into a membranous cup. Rudimentary ovary in male flower trifid. Fruit oblong, scarlet, from 2 to 2.5 in. long when ripe, and 1.5 in. in diam. Seeds compressed, sub-obcordate or sub-rotund, scrobiculate, the arillus thin, clear. Modecca trilobata, Roxb. Hort. Beng., 49; Roxb. Corom. Plant. III, t. 297; Fl. Ind., III, 133; Wall. Cat., 1234; Kurz, in Journ. As. Soc., Beng., 1877, II, 95; Masters in Hook. fil. Fl. Br. Ind., II, 602.

Andaman Islands; common.—Distrib. Northern parts of British India and Burma.

2. ADENIA NICOBARICA, King. Slender and slightly branched, glabrous Stems minutely sulcate, thin, wiry. Leaves membranous, 580

entire, narrowly elliptic-oblong or lanceolate; the base rounded and minutely bi-glandular, slightly peltate; the apex acuminate, rarely abruptly acute; both surfaces shining; main-nerves only about 4 pairs, interarching broadly and far from the edge; intermediate nerves horizontal; reticulations wide; length 2.5 to 4.5 in.; width 6 to 1.8 in.; petiole 4 to 8 in., compressed, not enlarged at the base. Peduncles longer than the petioles but much shorter than the leaves, bearing a filiform tendril and only one or two flowers. Flowers rather less than ·5 in. long, green. Female flower unknown. Male flower ·4 to ·5 in. long Calya campanulate, deeply divided into 5 linear-oblong, subacute, much reflexed lobes. Petals shorter than the calyx and inserted into it below the middle, membranous, reticulate, oblanceolate, their apices truncate and broad. Glands short, oblong, truncate. Anthers about equal to the petals, oblong, obtuse, cordate at the base; the filaments united into a wide tube. Fruit elliptic-oblong, tapered to each end, from 1.5 to 2:3 in. long, and .75 in. in diam., reddish when dry, smooth. Seeds much compressed, sub-orbicular, with a few shallow pits in the centre, and a row of short depressed radiating grooves round the edge, the aril very thin. Modecca nicobarica, Kurz in Trimen's Journ. Bot. for 1875, p. 327; Mast. in Hook. fil. Fl. Br. Ind. II, 603.

Andaman and Nicobar Islands; not uncommon. Malacca; Maingay (Kew Distrib.) 670. Perak; Wray 651, 2781; King's Collector 2439; Scortechini 633; Ridley 10280. Penang; Curtis 1521.

A species distinguished by its entire oblong leaves minutely peltate at the base, by its long narrow reflexed calyx-lobes, and by its rotund seeds with shallow pits in the centre and radiating grooves at the edges.

3. Adenia Cardiophylla, Engl. in Jahrb. XIV, 376. Rather stout, Stems almost terete. Leaves membranous, remote, broadly ovate, rotund-ovate, sometimes almost sub-reniform, the base deeply cordate, the auricles rounded; the apex with a short triangular point; both surfaces smooth; the lower with numerous distinct reticulations; main-nerves about 9, radiating from the base; the secondary nerves sub-horizontal, numerous; length 5 to 9 in.; breadth 3.5 to 7.5 in.; petiole 2 to 4.5 in. long, not thickened at the base but with 2 sessile glands at the apex. Peduncles 4 to 6 in. long, longer than the petioles, with several widely-spreading cymose branches and usually one tendril. MALE FLOWER narrowly ovoid, 2 in. long. Calyx leathery, spotted inside, the mouth with blunt short teeth. Petals thin, broadly oblong-lanceolate, subacute, spotted, their apices level with those of the teeth of the calyx, their bases inserted about the middle of the calyx-tube. Glands short, oblong-cuneiform. Anthers linear-ovate, acute, the filaments united into a tube inserted into the fundus of the calyx. Female flower twice as long as the male, tubular. Calyx as in the male, the teeth recurved. Petals as in the male, their apices entire or minutely serrulate. Ovary ovoid, on a short gynophore, the stigma peltate 3-lobed. Fruit broadly fusiform, 2 to 2.5 in. long and 1 in. in diam. at the middle, dirty-yellowish when dry. Seeds compressed, sub-rotund, keeled, with prominent sharply edged deep pits in the centre and a row of elongate pits round the edges. Modecca cardiophylla, Mast. in Hook. fil. Fl. Br. Ind. II, 602. Modecca cordifolia, Kurz (not of Blume) in Journ. As. Soc. Beng., 1876, II, 132: Masters in Hook. fil. Fl. Br. Ind. II, 602. M. heterophylla, Kurz, (not of Blume) Andam. Report Append. A., 39.

Andaman Islands; very common. NICOBAR and GREAT COCO ISLANDS; Prain.—DISTRIB. Cambodia, Khasia Hills and Eastern Bengal, tropical Eastern Himalaya.

A species well marked by its deeply cordate leaves much reticulate on the lower surface, widely-spreading cymes and sub-rotund cancellate pitted seeds. Some confusion in nomenclature has arisen from the fact that Kurz, without having seen authentic specimens of Blume's two species Modecca cordifolia and M. heterophylla referred this plant to both of them. Dr. Masters perpetuated part of Kurz's mistake by accepting his view as to the identity of this Andaman and Nicobar plant with M. cordifolia, Blume, whereas the whole of the Andaman material (greatly increased in bulk since he wrote) really belongs to his own species M. cardiophylla. This view was first expressed by Dr. D. Prain, Superintendent of the Calcutta Garden in a note on one of the specimens in the Herbarium there.

4. Adenia populifolia, Engl. in Jahrb. XIV, 376, var. pentamera King. A slender and often very extensive climber (often 150 feet) Stems slender, smooth, terete. Leaves thinly coriaceous, oblong-ovate, gradually narrowed to the acute or sub-acute apex, the base slightly cordate; both surfaces smooth, the nerves and reticulations little prominent when dry: main-nerves 5 to 7 pairs, curved, spreading, rather faint; length 3 to 5 in.; breadth 1.75 to 2.5 in.; petiole .75 to 1.25 in., its apex bearing 2 large cup-shaped glands conjoined by their backs. Peduncles shorter than the leaves with 2 slender spreading branches and a single rather stout tendril. Flowers not numerous, on slender unequal pedicels, some of them '75 in. long. MALE FLOWER '2 in. long, narrowly fusiform; the calyx with 5 short oblong blunt lobes. Petals springing from the calyx-tube just below its lobes, and like them but narrower. Anthers 5, broadly linear, the connective slightly produced beyond the apex, shortly sagittate at the base; filaments joined into a tube and inserted into the fundus of the calyx: rudimentay ovary linear. Female flower shorter than the male (only '15 in. long) and not so slender but with similar calyx-lobes and petals. Ovary oblong. crowned by three erect oblong rather large stigmas. Fruit double fusiform, deep red when ripe, 2:5 to 3 in. long and from '75 to 1 in. in

diam. Seeds broadly oblong, compressed, foveolate with a row of short radiating grooves round the edges. Modecca populifolia, Blume Rumphia, 168 t. 50. M. populifolia, Bl.: Masters in Hook fil. Fl. Br. Ind. II, 603 (amongst imperfectly known species).

MALACCA; Maingay (K.D.) 668. PERAK; Scortechini 1609; King's Collector, many Nos.

Blume describes and figures his *Modecca populifolia* plant as tetramerous and as this exactly agrees both with his text and figure, except in being pentamerous, I regard it as a variety. There are in Herb. Calcutta specimens from Perak without flower or fruit, of what appears to be a 3-lobed form of this.

5. ADENIA ACUMINATA, King. Stems slender, striate. Leaves subcoriaceous, ovate-oblong or rotund-ovate, the base usually narrowed but sometimes sub-cordate always bi-glandular; the apex shortly and abruptly acuminate: the secondary nerves and reticulations distinct on both surfaces when dry but especially on the lower; main-nerves 2 or sometimes 3 pairs, originating from the midrib near its base, all prominent: length 4 to 6 in.; breadth 2 to 4 in.; petiole .75 to 1.35 in. long. Peduncles usually nearly as long as the leaves but sometimes much shorter, bearing a few short many-flowered spreading branches at the apex and often a short tendril. MALE FLOWER narrowly ovoid, 25 to 3 in. long. Calyx leathery with 5 short ovate-lanceolate lobes. Petals thick, oblong, acute, springing from the calyx-tube above the middle. Glands small, lauceolate. Anthers linear, sub-acute, erect, the filaments short. Female flower larger than the males (4 in. long), tubular, swollen in the lower third. Calyx-lobes very short, broad, blunt, incurved. Petals narrowly oblong, sub-acute, incurved. Ovary fusiform. Fruit fusiform, dull, reddish when dry, about 2 in long and '75 in. in diam, at the middle. Seeds compressed, subrotund, boldly pitted in the centre and with a marginal row of radiating grooves on each side, slightly oblique and pointed at the base. Modecca acuminata, Blume Bijdr. 940; Miq. Fl. Ind. Bat. I, Pt. 1,702. M. singaporeana, Mast. in Hook. fil. Fl. Br. Ind. II, 601 (in part).

Perak; Scortechini 254, 459, 629; Wray 498, 1745; Ridley 9462, 9632; King's Collector, many numbers. Selangor; Ridley 7288. Malacca; Goodrich 1340.—Distrib.; Java, Sumatra, (Beccari P.S. 743).

6. ADENIA SINGAPOREANA, Engl. in Jahrb. XIV, 376. Stems slender, striate. Leaves subcoriaceous, oblong to ovate-oblong, cuneate and biglandular at the base, the apex sub-acute or shortly and bluntly acuminate; both surfaces smooth, opaque, the lower very pale, the secondary nerves and reticulations very indistinct on both; main-nerves 3 pairs, the lower two pairs bold and ascending, the upper pair less bold and spreading; length 3.5 to 4.5 in.; breadth 1.75 to 2.25 in.; petiole

·5 to 1·5 in. long. Peduncles about as long as the petiole, few-flowered. Male flowers (fide Masters) "·25 in. long, elongate, fusiform. Calyx leathery, shortly 5-lobed; lobes ovate, connivent (? always). Petals thick, leathery, oblong-acute, springing from the calyx-tube just beneath the throat. Corona none (?). Glands of the disc 5, small, oblong, at the base of the calyx-tube, opposite to its lobes. Stamens 5; anthers sub-sessile, erect, linear; connective long, thread-like. Rudimentary ovary fusiform. Fruit 2 in. long, glabrous, fusiform." Seeds compressed, sub-ovoid, obliquely contracted to a short podosperm, the centre boldly tubercled, the edges with a row of broad grooves the tubercles between which on the extreme margin are bold and some of them black. Passiflora singaporeana, Wall. Cat. 1232. Modecca singaporeana, Masters in Hook. fil. Fl. Br. Ind. II, 601.

SINGAPORE; Wallich. JOHORE; King. MALACCA; Maingay (K.D.) 667.—DISTRIB. Java.

A species badly represented in collections and misunderstood. It is based on the plant collected by Wallich at Singapore and issued by him under his Cat. No. 1232 and named Passiflora singaporeana. With this agree absolutely a plant collected by Mr. Hullett and myself at Jaffaria (in Johore) also some specimens collected by Mr. H. O. Forbes in the Preanger in Java (Herb. Forbes 565). Maingay collected at Malacca six specimens of a Modecca all of which in Herb. Kew. are named M. singaporeana. In my opinion five of these belong to M. acuminata, Bl. I have seen no flowers of M. singaporeana and the account of them given above is copied verbatim from Masters. The leaves are very opaque and of a dull pale colour beneath, and the nerves are very faint. The fruit is slightly shorter than that of M. acuminata, Bl. of which species this is I fear little more than a form.

## Order LII. BEGONIACEIÆ.

Succulent herbs or undershrubs; stem often rhizomatous or tubererous. Leaves alternate (sometimes falsely whorled), more or less unequal-sided, entire, toothed or lobed; stipules 2, free, frequently deciduous. Peduncles axillary, dichotomously cymose, the branches and. bracts at their divisions generally opposite. Flowers white rose or yellow, showy, sometimes small, monœcious. Male: perianth (of the only Indian genus) of 2 outer valvate opposite sepaloid segments, and 2-0 inner smaller segments; stamens indefinite often very many, free or monadelphous, anthers narrowly obovoid. Female: perianth (of the only Indian genus) of 5-2 segments. Ovary inferior (in Hildebrandia half-superior), 2-3-4-celled; placentas vertical, axile (at the time of æstivation), divided or simple; styles 2-4, free or combined at the base, stigmas branched or tortuous; ovules very many. Fruit capsular, more rarely succulent, often winged, variously dehisting or irregularly breaking up. Seeds very many, minute, globose or narrow-cylindric, testa 584

11. B. Kunstleriana.

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reticulated: albumen very scanty or 0.—DISTRIB. Species 400 (of which 398 belong to the genus *Begonia*), in all tropical moist countries; not yet met with in Australia.

### 1. BEGONIA, Linn.

Characters of the Order.	
GROUP I. Capsule 3-celled, with 3 nearly equal narrow	
vertically oblong wings, dehiseing by 2 oblong valves on	
each face between the wings:	
Small acaulescent herbs, only a few inches in height:	
leaves rotund-ovate slightly oblique	1. B. Forbesii.
Herbs with stems 2 or 3 feet high; leaves obliquely ovate-	
oblong or ovate-lanceolate, the base cordate and very unequal-sided:—	
Male flowers 2 to 3 in. across	2. B. isoptera.
Male flowers 1.5 in. across	3. B. isopteroidea.
GROUP II. Capsule 2-celled, triquetrous, with 3 short un-	*
equal wings, dehiscing irregularly by the breaking up of the	
fragile faces between the wings; anthers obovoid, often	
emarginate at the apex:—	
Caulescent; rootstock tuberous:—	
Upper surfaces of leaves with numerous adpressed	
white stellate hairs; bracts of inflorescence '05 to '1 in.	
long, densely adpressed-pubescent; male flowers '2 to '25 in. in diam.; capsules about 3 in. broad	4. B. sinuata.
Upper surfaces of leaves scantily adpressed hairy;	T. D. athacea.
bracts '35 to '5 in. long, glabrous; male flowers '5 in.	
and capsules '6 in. across	5. B. andamensis.
Leaves glabrous	6. B. debilis.
Acaulescent; rhizome creeping:-	
Leaves rather thick (when dry), rotund-reniform,	
deeply cordate the basal lobes overlapping, the nerves	
beneath and the petioles rusty-tomentose	7. B. thaipingensis.
Leaves very thin (when dry), obliquely ovate-reniform, quite glabrous except for a few sparse hairs on the	
under surface of the nerves; petioles glabrous	8. B. guttata.
Group III. Capsule 2-celled, triquetrous with 3 wings one	o. D. partesta.
of which is much elongated transversely so as greatly to	
exceed the other two, dehiscing by the rupture of the stout	
membranous faces between the wings:-	
Anthers cuneiform-oblong; leaves peltate	<ol> <li>B. Hasskarlii.</li> </ol>
Anthers linear-oblong or linear; leaves not peltate:-	
Leaves not at all or very little oblique even at the base,	
not cordate; petioles very long:-	
Leaves with coarse hairs on both surfaces:—	10. B. Scortechinii.
Leaves narrowly lanceolate	10. B. Scortechini.

Leaves ovate-lanceolate

Leaves glabrous :—	
Leaves broadly elliptic-ovate, equal-sided at the base Leaves ovate-lanceolate, unequal-sided especially	12. B. Herveyana.
at the base	13. B. perakensis.
Leaves glabrous even on the nerves :	
Male flowers less than 1 in. across Male flowers about 1.5 in. across	<ol> <li>B. paupercula.</li> <li>B. venusta.</li> </ol>
Leaves glabrous, but the nerves hairy'; male flower	
2 in. across Leaves with a few coarse compressed rusty-pubescent hairs on both surfaces; nerves beneath, petioles and	16. B. megapteroide
also peduncles rusty-pubescent; male flowers 8 in.	17 70 75
Upper surfaces of leaves papillose and bearing coarse hairs:—	17. B. Mazwelliana
Acaulescent; petiole much longer than the lamina	18. B. praeclara.

Stems 3 feet high; petiole shorter than the blade 19. B. Lowiana.

1. Begonia Forbesii, King n. sp. A small plant a few inches high with densely rusty-villose rhizome. Leaves rotund-ovate shortly apiculate, sometimes blunt, the base slightly cordate, the edges subentire or remotely denticulate; upper surface glabrous: the lower with numerous white scales and a few coarse hairs on the nerves near their bases: main-nerves 9, radiating from the base, inconspicuous; length 1.25 to 2.25 in.; breadth 1 to 2 in.; petiole 1.5 to 3 in.; stipules lanceolate, villous externally, 3 in. long. Peduncles as long as or longer than the leaves, slender, glabrous, bearing a solitary flower at the apex, or 2-branched and bearing 2 to 5 flowers; bracts absent on the lower part of the peduncle, in pairs in its upper part, small, obovate-oblong. Flowers pink, their pedicels red. MALE; sepals 2, oblong, blunt, 15 in. long; petals 2, similar but smaller; stamens numerous; anthers obovate, with emarginate apices, filaments short. Females; perianth of 4 unequal pieces, the outermost rotund-ovate: the inner oblong. Styles 3, thick, the stigmas large, flattened, rotund. Capsule 3-celled, opening on each face; the wings subequal, spreading, triangular, blunt.

Perak; Wray 2476.—DISTRIB. Sumatra, Forbes 2666.

2. Begonia isoptera, Dry. in Smith's Ic. 43. Caulescent: three feet high, nearly glabrous; stem and branches slender. Leaves obliquely ovate-oblong or ovate-lanceolate, shortly acuminate, the base cordate, the sides very unequal; edges remotely and usually coarsely dentate; upper surface of leaves quite glabrous, the lower minutely scaly; mainnerves mostly radiating from the base, branched, prominent; length 3.5 to 6 in.; breadth 1.5 to 3 in.; petioles slender, varying from 5 to

2.25 in. in length: stipules lanceolate or oblong, 75 in. long. Inflorescence leaf-opposed, shorter than the leaves, slender; the female flowers near its base, the male on short branches on its upper half. Males 2 to 3 in across; sepals 2, rotund; petals 0; stamens numerous, broadly oblong or obovate, minutely apiculate; filaments short. Female perianth-segments 5. Styles three, bifid, the arms twisted. Capsule 3-celled, about 8 in. long and equally broad, dehiscing by two slits on each face, the three wings equal, narrow, oblong, 25 in. wide. Dry. in Trans. Linn. Soc. I, 160. B. repanda, Bl. Enum. Pl. Jav. I, 97. Diploclinium repandum, Klo. Begon. 72. Begonia Wrayi, Hems. in Journ. Bot. for 1887, 203.

Perak; Scortechini and King's Collector, many numbers. Malacca; Hervey. Selangor; Ridley 8589. Pahang; Ridley 2246. Negri Sembalan; Ridley 10028. Penang; Curtis 7094.—Distrib. Sumatra, Java.

- B. bombycina, Bl. (Enum. Pl. Jav. 97) is possibly identical with this; it has been reduced here by De Candolle and part of it is no doubt so reducible. Under B. bombycina however have been distributed specimens of an allied species with larger flowers in short spreading cymes. Which of the two plants Blume intended as his B. bombycina, it is impossible from his short description and in the absence of authentic specimens to determine.
- BEGONIA ISOPTEROIDEA, King n. sp. Caulescent, 3 feet high, glabrous. Leaves thin, very obliquely ovate-lanceolate acuminate; the base acute on one side of the petiole but with a broad round auricle on the other, the edges remotely lobulate-dentate; lower surface with very minute white scales; main-nerves 7, radiating from the base, rather prominent beneath; length 3.5 to 4.5 in.; breadth 1.2 to 1.5 in.; petioles unequal, 2 to 3:5 in long. Stipules broadly lanceolate, acute, .5 to '75 in. long. Peduncles slender, axillary, about an inch long and bearing about two flowers on long slender pedicels and one sub-sessile. Flowers pink, large. Males; sepals 2, rotund-oblong, blunt, '75 in. long; petals 2 similar but only 5 in. long; stamens inserted on an elongate anthophore, the anthers quadrate, 2-groved, truncate, only about half as long as the slender filaments. Females nearly as large as the males; style short, thick, divided into 3 slender, bifid spiral spreading branches. Capsules about '75 in. in length and breadth, 3-celled, its wings narrow oblong, thin, membranous, the posterior narrower than the lateral.

PERAK; on Gunong Brumban, elevation 5,000 feet; Wray 1548.

A species in leaves capsules and habit resembling B. isoptera, but with much larger flowers.

4. Begonia sinuata, Wall. Cat. 3680. Shortly caulescent (from 2.5 to 12 inches high) the rootstock tuberous. Leaves either broadly

reniform and blunt, or sometimes with a short broad abrupt apiculus. the basal sinus deep and the edges wavy and minutely denticulate or crenate; or reniform-cordate, gradually tapered to the sub-acute apex, the margins slightly lobulate-dentate, the lobes denticulate, the basal sinus small: length of the reniform over 4 to 6 in.; breadth 5 to 8 in., of the ovate-reniform 1:5 to 3 in.; breadth 1 to 3 in.; petioles of the radical leaves 1 to 3 in.; of the cauline '5 to 2.5 in.; both surfaces with numerous adpressed white stellate hairs, the lower with small oblong white scales also; main-nerves 7 to 11, radiating from the base, prominent on the lower surface; petioles unequal, 5 to 3 in. long, pube-Stipules small, oblong-lanceolate, slightly oblique, blunt, glabrous. Inflorescence 3 to 8 inches long, sparsely stellate-puberulous; the peduncle very slender; branches few, short, filiform, few-flowered; bracts minute (.05 to .1 in. long) bluntly lanceolate, rather densely adpressed-pubescent externally, the upper in whorls of three. Flowers small, pink, glabrous. Males about '2 to '25 in. in diam.: sepals 2, roundish; petals 2, narrower, obovate; stamens about 20, monadelphous; anthers obovoid, connective not produced. Female perianthsegments 5, the inner gradually smaller. Styles 2, combined for half their length, stigmas lunate. Capsule about 3 in. broad and slightly longer, the posterior wing the largest. Seeds ovoid, shining, brown, deeply pitted. A. DC. Prod. XV, Pt. I, 354; Kurz in Journ. As. Soc. Beng., 1877, Pt. II, 108; Clarke in Hook. fil. Fl. Br. Ind. II, 650. Diploclinium biloculare, Wight Ic. 1814. Begonia guttata, elongata et subrotunda, Wall. Cat. 3671 B (not A), 6291, 6293.

Penang; Wallich; Phillips; King's Collector 2269, 4860; Curtis 390, 481, 3098; Ridley 9229. Malagga; Maingay (K.D.) 674. Perak; King's Collector 4971.—Distrib. Burma; Griffith, Parish.

5. Begonia and and amensis, Parish ex Clarke in Hook. fil. Fl. Br. Ind. II, 650. Like the reniform-leaved form of B. sinuata, but the hairs on the surfaces of the leaves scanty: the inflorescence usually longer and its peduncle and branches much stouter; the bracts glabrous, longer (35 to 5 in.) and blunter and the male flowers (5 in. across) and capsules (6 in. across) longer and more numerous than those of B. sinuata.

Andaman Islands; Parish; King's Collector.—Distrib. Burma.

This ought probably to be regarded as a variety of B. sinuata. Actual specimens of the two look more different than written descriptions lead one to suppose; I therefore retain this as a species.

6. Begonia debilis, King n. sp. Aslender weak herb, about 6 to 8 inches high, caulescent. Leaves thin, narrowly reniform, blunt or subacute; the base unequal, rounded at both sides but one auriculate and 588

much longer; edges sub-entire or slightly remotely and obscurely crenate; breadth 1.5 to 3 in.; length (from base of largest lobe to apex) 3.5 to 7 in.; upper surface glabrous, the lower minutely scaly; mainnerves 7, radiating from the base, some of them branching, rather prominent below; petioles 1 to 3 in. long. Inflorescence axillary or terminal, slender, longer than the leaves, with a few lax filiform dichotomous spreading few-flowered branches, bracts in pairs, ovate-lanceolate, 1 to 15 in. long. Flowers pure white, the stamens yellow. Male ·35 in. across; sepals 2, oblong-ovate, blunt: petals 2, similar but smaller; stamens in a globular mass: anthers obovate, short with broad emarginate inappendiculate apices. Female perianth of 5 unequal obliquely oblong pieces; styles united into a short column, above divided into numerous crowded awns. Capsule .75 in. broad (to the end of the wings), and 4 in. from base to apex, glabrous, 2-celled: the 2 lateral wings triangular, acute, the posterior wing oblong, tapering a little to the blunt apex, more than twice as long as the lateral.

PERAK; King's Collector 8289.

A species allied to B. varians, A. DC., but with more entire leaves.

7. Begonia thaipingensis, King n. sp. Rhizome long, creeping, rooting at intervals, wire-like, rusty-villous. Leaves rotund-reniform. the edges minutely and rather remotely dentate, the basal sinus mostly obliterated by the overlapping of the auricles; both surfaces scaly the lower more distinctly so and rusty tomentose on the 6 or 7 radiating sub-prominent nerves; length 1.25 to 2 in.; breadth 1.5 to 2.25 in.; petioles unequal, 1 to 4 in. long, densely rusty-tomentose. Peduncles 4 to 9 in. long, sleuder, sparsely rusty-villous, bearing one or two remote pairs of small lanceolate bracts and near the apex 3 to 5 slenderly pedicellate pink flowers on slender branches. MALE flowers; sepals 2, sub-rotund, 15 in. long; petals 2, smaller, oblong; stamens numerous; anthers obovate, the apex blunt and emarginate, the filaments short. FEMALE perianth of 5 unequal pieces, the largest most external: style short, thick, with 2 stout arms and short thick twisted stigmas. Capsule 2-celled, 5 in. broad (to the ends of the wings); all the wings triangular, sub-equal.

PERAK; Scortechini 1479; Wray 1774; King's Collector 2523, 8511.

A species allied to B. sinuata, Wall., but differing by the creeping rhizome, non-apiculate leaves, rusty-tomentose petioles and peduncles.

8. Begonia guttata, Wall. Cat. 3671 A. Stem succulent, short. weak, bearing about two thin obliquely ovate-reniform glabrous nearly entire leaves with oblique cordate bases, and subacute apices; the nerves about 5, radiating from the base, prominent, sparsely hairy;

4 to 7 in. long and 2 to 4.5 in. broad; petioles 1.5 to 4 in. Peduncles varying in length from 1 to 2 in., slender, glabrous, bearing a few flowers near the apex. Male flower; sepals 2, rotund; petals 2, narrowly oblong; stamens about 50, monadelphous; anthers obovoid. Female; perianth-segments 5, gradually smaller inwards: styles 2, with two twisted branches. Capsule 4 in. long and 75 in. broad to the ends of the wings, the smaller wings very narrow; the posterior one broad, descending. A. DC., Prod. XV, Pt. I, 352; Clarke in Hook. fil. Fl. Br. Ind. II, 648.

Perak; Scortechini 571. Malacca; Maingay (Kew Distrib.) 675.

PENANG; Wallich. SELANGOR; Ridley 7289.

9. Begonia Hasskarlii, Zoll. et Mor. Syst. Verz. Zoll. 31 (not of Miq.) All parts glabrous. Stem a creeping rhizome. Leaves rotundovate, shortly and abruptly caudate-acuminate, peltate, the edges wavy but entire; both surfaces glabrous, the upper pitted when dry, the lower with sub-rotund scales; main-nerves about ten, radiating from the insertion of the petiole, not very prominent; length 3.5 to 5.5 in.; breadth 2.25 to 3.75 in.; petiole attached to the leaf about .75 to 1.25 in. from its lower edge; stipules short, lanecolate. Peduncle usually longer than the leaves (often twice as long), about as thick as the petioles, bearing a few sleuder branches near the apex, ebracteate. Flowers small, white tipped with red. MALE 2 in. broad; sepals 2. reniform, the margins thick. Stamens numerous, cuneiform-oblong, their apices emarginate; filaments very short, free. Female, sepals 2. with vertical veins, reniform; style short, thick, with 4 short branches; stigmas 4, much lobulate. Capsule 4-celled, 6 in. long, the lateral wings very narrow; the posterior broad slightly narrowed to the blunt apex, '5 in. long: seeds minute, ovoid, tapering to one end, brown, shining, pitted. B. peltata, Hassk. in Hoev. et De Vriese, Tijdschr. X (1843) 133. Metscherlicia coriacea, Klotzsch in Abh. Akad. Berl. (1855) 74; Mig. Fl. Ind. Bat. 1, Pt. I, 696. B. coriacea, Hassk. Pl. Jav. Rar. 209; B. hernandiaefolia, Hook. (not of others) Bot. Mag. t. 4676.

Perak; Scortechini 1607; King's Collector 4427, 8245; Ridley 9689.

PAHANG; Ridley 2442.—DISTRIB. Java, Zollinger 1613.

This is one of three species to which the specific name peltata has been given. That name must however be reserved for the Brazilian species to which it was first applied by Otto & Dietr. (Allg. Gartenz. IX (1841) 58). The MSS. name B. Hasskarliana was given by Miquel to a species near B. coespitosa which he confused with Zollinger's No. 1613 (the type of the species above described), and this inaccuracy was perpetuated by Miquel on p. 1091 of his Fl. Ind. Bat. I, Pt. I, where he describes Diploclinium Hasskarlianum.

10. Begonia Scortechinii, King, n. sp. Rhizome creeping, short, scaly.

Leaves on very long glabrous petioles, narrowly lanceolate, attenuate to the acuminate apex, and to the rounded or acute nearly equal-sided base; the edges dentate-ciliate; both surfaces with numerous scattered coarse subulate spreading hairs compressed at their bases, the lower also minutely scaly; main-nerves pinnate, 3 or 4 pairs, then ascending; length 2.75 to 4 in.; breadth 5 to 1 in.; petioles 5 to 7 in. Peduncles axillary, somewhat shorter than the leaves, glabrous, bearing at the apex 2 few-flowered branches and a few rather long bracts. Flowers white, tinged with pink and green. Male: sepals ovate, obtuse, '75 in. long; petals narrower but nearly as long. Stamens numerous, in a short column; anthers linear-oblong, the apical appendage obtuse; filaments short. Female with perianth-segments similar to the male (fide Scortechini) but 5. Ovary glabrous, 2-celled; styles free, 2 to 4-fid. Capsule '75 in. broad (including the wings) the lateral wings narrow, oblong, the posterior much larger (fide Scortechini).

Perak; Scortechini 1845; King's Collector 7227.

I have seen no ripe capsules, and the above description of them is taken from Scortechini's field-note. The species is readily distinguishable by its very narrow equal-sided coarsely hairy leaves. A drawing of this, sent to Herb. Kew from Penang by Mr. C. Curtis, represents the leaf-petioles as not more than one inch long.

Begonia Kunstleriana, King n. sp. Rhizome creeping, very scaly. Leaves ovate-lanceolate to lanceolate, often but not always unequal-sided, much acuminate; the base cuneate usually oblique; edges ciliate-serrate, the teeth slightly unequal; both surfaces with coarse spreading hairs with dilated flattened bases; the lower with minute white scales also; main-nerves about 3 pairs, pinnate, densely rufescent villous like the petioles; length 5 to 7.5 in.; breadth 1.75 to 2.5 in.; petiole from half as long to nearly as long as the blade. Peduncles longer than the petioles and more slender, glabrous, 2- to 4-flowered at Flowers large, white, tinged with red. MALE; sepals 2, elliptic, obtuse, 1 in. long and 5 in. broad, vertically veined; petals similar but not half so large. Stamens numerous, linear-oblong, bluntly apiculate. Female perianth of 5 oblong blunt segments; styles 2, each with two short twisted branches. Capsule (to the end of the posterior wing) 1 in. broad: the lateral wings short, narrow; the posterior elongate not tapered to the apex, 2-celled. Seeds ellipsoid, shining, brown, pitted.

PERAK; King's Collector 7194; Scortechini; Ridley 9651.

This resembles B. Scortechinii, but has larger leaves and shorter petioles which are densely villous.

12. Begonia Herveyana, King n. sp. Glabrous except for a few

hairs on the nerves on the lower surface of the leaves: rhizome creeping, thin. Leaves broadly elliptic-ovate, shortly acuminate, slightly narrowed to the rounded almost equal-sided base; the edges slightly undulate, very indistinctly serrate; upper surface glabrous, lower very minutely scaly; nerves pinnate, about 6 pairs, ascending, branching; length 5 to 9 in.; breadth 3 to 4.5 in.; petioles much longer than the leaves, glabrous; stipules lanceolate, inconspicuous. Peduncles 5 to 10 in. long, slender, bearing near the apex 2 or 3 branches with few shortly pedicellate flowers. Male flowers; sepals 2, ovate-subrotund; petals 2, much smaller, oblong, blunt; stamens numerous, arranged in a cone, linear, with a blunt apical appendage, the filaments short. Female perianth of 5 subrotund pieces. Capsule 1 in. broad and about half as much from base to apex, imperfectly 4-celled: lateral wings narrow oblong; the posterior wing ovate, blunt, about 65 in. long.

MALACCA; Hervey; Derry.

This is a very distinct species resembling in the shape of its leaves no Asiatic *Begonia* that I have seen, except on unnamed species from Tonkin (No. 3763 of Herb. Balansa).

13. Begonia perakensis, King n. sp. Rhizome slender, creeping. Leaves ovate-lanceolate, slightly unequal-sided, acuminate; the base broad, rounded or very slightly emarginate or oblique, the edges obscurely and remotely dentate, or sub-entire; both surfaces glabrous, the lower minutely scaly; main-nerves pinnate, 4 or 5 pairs, ascending; length 3.5 to 5.5 in.; breadth 1.5 to 2.25 in.; petiole 2.5 to 5 in.; slender, glabrous. Peduncles usually longer than the leaves (at least when in fruit), 4-angled, glabrous, few-flowered. Flowers whitish tinged with pink, or pink. Male; sepals rotund-ovate, 4 in. long. Petals 2, oblong and much smaller. Stamens numerous, linear with short blunt apical appendages and short filaments. Female perianth of 5 (?) segments. Capsule (ripe) 1.2 in. broad (to end of posterior wing), and 5 in. from base to apex, 2-celled; the lateral wings oblong, narrow; the posterior oblong, blunt, slightly oblique, 35 in. broad; seeds small, ellipsoid, pitted, shining.

PERAK; King's Collector 10338, 10506, 10951.

Specimens of a species closely resembling this, but insufficient for accurate determination, have been collected in Selangor by Mr. Ridley (Herb. Ridley 8590).

14. Begonia paupercula, King n. sp. Rhizome creeping, acaulescent, everywhere glabrous. Leaves ovate, very unequal-sided and very oblique at the base, or ovate-lanceolate, slightly unequal-sided and little oblique at the base; the apex always acuminate, the edges slightly sinuate-lobed, obscurely dentate; both surfaces glabrous: main-nerves 5 to 7, radiating from the base, prominent below, midrib with a few 592

lateral nerves, length 3.5 to 5 in.; breadth 1.25 to 3.5 in.; petioles varying in length from 2.5 to 7 in., slender, 2-to 3-flowered. Flowers white, tinged with red. Males; sepals 2, elliptic-oblong, 4 in. long; petals 0. Stamens linear-oblong, shortly and bluntly apiculate: filaments short. Female; the perianth of 5 very unequal lobes, the outermost larger than the sepals of the male. Capsules 6 in. long and 1 in. broad, 2-celled; the 2 lateral wings sub-elliptic, oblique, 3 in. broad; the posterior wing oblong, blunt, 6 to 7 in long and 35 in. broad.

PERAK; King's Collector 5952.

This has leaves resembling those of *B. borneensis*, but the flowers are fewer and larger. Beccari's Sumatra specimens (P.S. 857), in fruit only, appear to belong to this species.

15. Begonia venusta, King n. sp. Rhizome slender, creeping; whole plant glabrous. Leaves reniformly ovate, shortly acuminate, the basal sinus deep; the edges sub-entire or remotely and minutely denticulate; both surfaces smooth, shining: main-nerves 7, radiating from the base, slender; length 3 to 5.5 in.; breadth 2 to 3.5 in.; petioles unequal, slender, from 6 to 12 in. in length. Peduncles 3.5 to 6 in. long, bearing about 3 pedunculate pinkish-white flowers near the apex. Male; sepals 2, ovate-rotund, blunt, 75 in. long. Petals 2, somewhat larger. Stamens narrowly oblong, with a large apiculus; filaments unequal, the inner ones long, the outer short. Females smaller than the male, the perianth of 5 unequal broad blunt segments; styles very short, with numerous broad depressed lobules. Capsule 3 in. long and 1.15 in. broad (to the ends of the wings); lateral wings more than half as long as the posterior, broadly triangular, blunt; posterior wing oblong, blunt, 7 in. long.

PERAK; at an elevation of about 6,000 ft., Wray 1598.

The leaves are not unlike those of B. paupercula and B. borneensis but the flowers are large and handsome.

16. Begonia megapteroidea, King n. sp. Rhizome as thick as a swan-quill, creeping on rocks. Leaves broadly and very obliquely ovate, acuminate; both sides of the base rounded but very unequal, the sinus between them wide, the edges remotely and minutely dentate, upper surface glabrous; the lower also glabrous except the rusty-pubescent nerves which are also scaly near the base: main-nerves about 8, radiating from the base, the larger branched and all rather prominent; length (from ap of petiole to apex of blade) 4 to 5 in.; breadth 4 to 5 in.; petiole 12 to 16 in. long, glabrous. Peduncles from half as long to nearly as long as the leaves, glabrous, ebracteate below the flowers. Male flowers: sepals rotund-ovate, very obtuse, 1 in. long and 6 to 7 in. broad; petals much smaller, elliptic: stamens numerous, in a conical

mass on a short thick anthophore; anthers oblong, bluntly apiculate, filaments varying in length (the inner the longest). Female perianth of 5 unequal pieces: styles 2, rather long, combined at the base. Capsule not seen.

Perak; collected at an elevation of 5,000 ft., Wray 1450, 1573.

Specimens of this plant are rather scanty. They resemble B. megaptera, but are not caulescent like that species. In the Calcutta Herbarium there is, under the name Diploclinium tuberosum, Miq., a specimen collected by Kurz in Western Java which apparently belongs to this species. There are also two plants from Sumatra collected by Forbes (Herb. Forbes 2333a and 2255) which appear to belong to this. The genus Diploclinium is inseparable from Beyonia and the specific name tuberosa is pre-occupied in the latter by a species described by Lamack from the Moluccus which has a rounded tuberous root.

17. Begonia Maxwelliana, King n. sp. Rhizome as thick as a swan-quill, bearing many broadly lanceolate scales. Leaves broadly and obliquely ovate to ovate-rotund, more or less acuminate, the edges minutely ciliate-denticulate, the base very oblique, one side of it rounded the other rounded-auriculate, the sinus wide; both surfaces with a few coarse compressed rusty hairs, most numerous on the nerves near the base; the lower surface with minute white scales; main-nerves 7 to 9, radiating from the base, promineut; length 5 to 6 in.; breadth 4 to 7 in.; petioles 4 to 10 in. long, compresed (when dry) like the peduncles and like them rusty-pubescent. Peduncles unequal, those bearing only male flowers often shorter than the petioles; those bearing female and male, or females only often longer than the petioles; all ebracteate below the inflorescence, dichotomously branched and few-flowered at the apex; the bracts short, broad. MALE flowers densely clustered; sepals 2, oblong-ovate, blunt, 4 in. long, puberulous outside; petals 2, similar, but much smaller. Stamens numerous, without anthophore; authers linear, bluntly apiculate, slightly shorter than the filaments. Female perianth of 5 unequal pieces diminishing in size inwards; styles 2, short, much lobulate. Capsule 2-celled, I.4 in. broad (to the ends of the wings) and ·6 in from base to apex; the 2 lateral wings sub-quadrate, obtuse; the posterior oblong, blunt, more than three times as long as the lateral.

Perak; Maxwell's Hill, at elevation of 3,000 feet, Wray 119, 2199; Scortechini 1607, 1798; King's Collector 2038.—Distrib. Sumatra, Forbes

The flowers of this are white tinged with pink and the leaves green, the nerves beneath being red. This resembles B. megapteroidea, King, but the flowers are smaller, and the leaves and inflorescence are not glabrous as in that species.

18. Begonia Preclara, King n. sp. Rhizome creeping, very scaly. Leaves obliquely ovate, acuminate, the base rounded on one side of the

petiole and on the other expanding into a broad rounded auricle, the edges minutely dentate, rarely with small lobes besides: upper surface with numerous conical papillæ each bearing a coarse curved hair flattened at the base; under surface with a few scattered flattened hairs especially on the nerves; main-nerves 7, radiating from the base, prominent beneath; length 3.5 to 5.5 in.; breadth 2.5 to 3.5 in.; petioles unequal 3 to 6 in. long, with a few flexuose hairs near the apex. Peduncles longer than the petioles, slender, glabrous, 1- to 3-flowered. Flowers on rather long slender pedicels, pink. MALES; sepals 2, narrowly oblong-ovate, obtuse, '8 in. long; petals 2, narrowly oblong, blunt, 5 in. long; stamens linear-oblong, apiculate, the filaments unequal the central the largest. Female perianth unknown; styles 2, short, 2-branched, branches divided into many flat twisted lobes. Capsule 5 in. long and about 1.5 in. broad (to the ends of the wings); the lateral wings quadrate-ovate, obtuse, about 4 in. long; the posterior oblong, blunt, 1 in. long and '4 in. broad.

PERAK; at elevations of from 3,000 to 6,700 feet, Wray 318, 349, 427; King's Collector 8077.

The upper surface of the leaves is dark green, the nerves being coloured; the under surface is red of various tints and the flower-stalks are pale crimson.

19. Begonia Lowiana, King n. sp. Caulescent; 3 feet high; stems and branches covered with coarse flexuose glandular hairs. Leaves mostly very obliquely reniform; but some of the cauline ovate and nearly equal-sided acute, the basal sinus deep, the edges with a few very shallow lobes closely and rather minutely dentate-serrate and shortly ciliate; both surfaces coarsely rusty-pubescent, the hairs flexuose compressed and with dilated bases, the lower also with small white scales; main-nerves about 9, radiating from the base, prominent and densely villous; length 3 to 4.5 in.; breadth 4 to 7 in.; petioles unequal, stout, villous like the under surface of the ribs and midrib, from 4 in. long in the upper leaves, to 4 in. long in the lower. Cymes fewflowered, leaf-opposed and terminal, shorter than the leaves when in flower, much larger when in fruit; bracts ovate-lanceolate, opposite, ciliate. Flowers pink or white, pedicellate. MALE about '75 in. across; sepals 2, ovate-oblong, sub-acute, 5 in. long; petals 2, oblong, much smaller. Stamens uumerous, oblong, blunt, without apical appendages; filaments short. Female, the perianth of 5 pieces decreasing in size inwards; styles 2, deeply bifid and spiral. Capsules 65 in. long and twice as broad to the end of the wings; lateral wings very narrow (about 15 in. broad), the posterior oblique, broadly ovate, blunt, 9 in. long and 8 in broad.

Perak; at an elevation of 7,000 feet on Gunong Brumber Pahang, Wray 1567; also on Gunong Batu Puleh, Wray 316.

This resembles the Indian species *B. Thomsonii*, DC, but differs in being caulescent, in having shorter hairs on leaves and petioles, and in the posterior wing of the capsule being much larger. I have named the species after Sir Hugh Low, late British resident at Malacca, to commemorate his many services towards the botanical exploration of the Province of Perak.

#### Order LIV. FICOIDEÆ.

Herbs. Leaves simple, often fleshy, usually opposite or whorled; stipules 0 or scarious. Flowers usually in cymes or clusters, rarely solitary, regular, hermaphrodite rarely polygamous. Calyx of 4-5 segments, united into a tube or nearly distinct, free from the ovary in the Indian genera, often persistent. Petals usually wanting, when present small. Stamens perigynous or hypogynous, definite or indefinite; staminodes sometimes present. Ovary free (except in Mesembryanthemum), 2-5-celled, syncarpous (except in Gisekia); styles as many as the carpels: ovules numerous in each carpel and axile or solitary and basal. Fruit usually capsular, splitting dorsally or circumsciss, more rarely the carpels separate into cocci. Seeds many or 1 in each carpel, usually reniform, compressed; embryo curved or annular, surrounding the farinaceous albumen, radicle next the hilum.—Distrib. Species 450, chiefly African, a few are scattered through most tropical and subtropical regions.

Capsule with dorsal dehiscence ... 1. Sesuvium.
Capsule with dorsal dehiscence ... 2. Mollugo.

## 1. Sesuvium, Linn.

Succulent branching herbs. Leaves opposite, fleshy; stipules 0. Flowers axillary, sessile or peduncled, solitary, rarely in cymes. Calyxtube short; lobes 5, triangular-lanceolate, persistent, often coloured. Petals 0. Stamens many or 5, inserted round the summit of the calyxtube. Ovary free, 3-5-celled; styles 3-5; ovules many, axile. Capsule ovate-oblong, membranous, 3-5-celled, circumsciss. Seeds many in each cell, reniform; embryo annular.—Distrib. Species 4, littoral in warm climates.

Sesuvium Portulacastrum, Linn. Syst. ed. 10, 1058. Creeping and rooting in the sand, glabrous. Leaves linear-spathulate almost cylindric, sometimes sub-obovate: gradually narrowed into a short petiole with dilated scariously margined base. Flowers solitary, axillary, their pedicels 25 in. long. Calyx rose-coloured inside. Stamens 15 to 40, free or almost free. Styles 3 to 5. Capsule 2 in. across. Seeds black, shining, smooth, not numerous. Roxb. Fl. Ind. II, 509; Dalz. & Gibs. Bemb. 596

Fl. 15; Kurz in Journ. As. Soc. Beng. 1877, Pt. II, 110: Clarke in Hook. fil. Fl. Br. Ind. II, 659. S. repens, Willd. Enum. p. 511; DC. Prod. III, 453: W. & A. Prod. Fl. Pen. Ind. 361; Wight in Hook. Comp. Bot. Mag. II, 71, t. 23; Miq. Fl. Ind. Bat. I, Pt. I, 1060. Psammanthe marina, Hance in Walp. Ann. II, 660. Crithmum indicum, Rumph. Herb. Amb. VI, t. 72, fig. 1.

On the sea shores in the Andamans and the other Provinces.—DISTRIB. B. India, Malayan Archipelago.

## 2. Mollugo, Linn.

Herbs, branched, often dichotomous. Leaves often falsely whorled, or alternate, or all radical, from linear to obovate, entire; stipules fugacious. Flowers axillary, sessile or pedicelled, clustered or in panicles or racemes, small, greenish; bracts inconspicuous. Sepals 5, persistent. Petals 0; staminodes 0 or small in the same species. Stamens 5-3, rarely many. Ovary free, globose or ellipsoid, 3-5-celled; styles 3-5, linear or very small; ovules many, axile. Capsule membranous, sheathed by the sepals, 3-5-celled, dehiscing dorsally. Seeds several in each cell, rarely 1, reniform, appendaged or not at the hilum; embryo annular.—Distrib. Species 12, tropical and subtropical.

Mollugo Pentaphylla, Linn. Spec. Plantar. ed. 1 (1753), 89. A. few inches high, glabrous; stems much-branched, leafy, varying from oblong-lanceolate, lanceolate-acute to obovate-obtuse, contracted at the base, subsessile or sessile, from less than 5 in. to more than 2 in. in length. Panicles compound, terminal, many times longer than the leaves. Sepals elliptic or rotund, blunt. Stamens 3 to 5, short; filaments rather broad, compressed. Capsule globose, as long as the sepals, thin-walled, many seeded. Seeds dark-brown, tubercled; embryo curved. W. & A. Prodr. 44; Dalz. & Gibs. Bomb. Fl. 16; Kurz in Journ. As. Soc. 1877, Part II, 111. M. triphylla, Lour. Fl. Cochine. 79; DC. Prodr. I, 392; Roxb. Hort. Beng. 9, Fl. Ind. I, 360; Wall. Cat. 651; W. & A. Prodr. 44. M. Linkii, Seringe in DC. l.c. M. stricta, Linn. Sp. Pl. ed. II, 131; DC. Prodr. I, 391; Roxb. l.c.; Wall. Cat. 650; W. & A. Prodr. 44; Dalz. & Gibs. l.c.; Clarke in Hook. fil. Fl. Br. Ind. II, 663: Pharnaceum strictum, triphyllum and pentaphyllum, Spreng. Syst. I, 949.—Rheede Hort. Mal. x. t. 26.

In all the Provinces, near cultivated places.—DISTRIB. General throughout S. E. Asia.

### Order LV. UMBELLIFERÆ.

Herbs (rarely in non-Indian species shrubs or trees). Leaves alternate, usually divided or dissected, sometimes simple, petiole generally

sheathing at the base; stipules 0. Flowers hermaphrodite or polygamous, in compound umbels (simple in Hydrocotyle and Bupleurum), exterior of the umbel sometimes radiant; umbels with involucriform bracts at the base of the general one and bracteoles at the base of the partial ones (umbellules). Calyx-tube adnate to the ovary, limb 0 or 5-toothed. Petals 5, epigynous, often unequal, and with a median fold on the face, plane or emarginate or 2-lobed with the apex inflexed; imbricated in bud, in Hydrocotyle sometimes valvate. Stamens 5, epigynous. Ovary inferior, 2-celled, disc 2-lobed; styles 2, stigmas capitellate; ovules 1 in each cell, pendulous. Fruit of 2 indehiscent dorsally or laterally compressed carpels, separated by a commissure; carpels each attached to and often pendulous from a slender often forked axis (carpophore), with 5 primary ridges (1 dorsal, 2 marginal and 2 intermediate) and often 4 secondary ones intercalated between these; pericarp often traversed by oil-canals (vitte). Seed 1 in each carpel, pendulous, albumen cartilaginous; embryo small, next the hilum, radicle superior. - DISTRIB. Species about 1,500, mainly in Europe, North Africa, West Central and North Asia; a few are North American, tropical, and natives of the Southern Hemisphere.

Creeping unarmed herbs ... ... 1. Hydrocotyle. Erect spinous herbs ... ... 2. Eryngium.

## 1. HYDROCOTYLE, Linn.

Prostrate herbs, rooting at the nodes. Leaves (in the Indian species) cordate or hastate, not peltate, round or 5-9-gonal, subentire or palmately lobed, palmate-nerved, long-petioled; stipules small, scarious. Umbels (in the Indian species) simple, small; bracts small or 0; flowers white, sometimes unisexual. Calyx-teeth 0 or minute. Petals entire, valvate or imbricate. Fruit laterally compressed, commissure narrow; carpels laterally compressed or sub-pentagonal; lateral primary ridges concealed within the commissure, or distant therefrom and prominent; vittæ 0, or most slender, obscure; carpophore 0. Seed laterally compressed.—Distrib. Species 70; in wet places in tropical and temperate regions, more numerous in the Southern Hemisphere.

Petals acute, valvate; fruit with no secondary ridges;
pericarp thin ... ... ... 1. H. javanica.

Petals obtuse, imbricate; fruit with prominent secondary
ridges, the pericarp thickened ... ... 2. H. asiatica.

1. Hydrocotyle Javanica, Thunb. Dissert. Hydrocot. rt. 17, t. 2: ed. Pers. II, 415, t. 2. Leaves reniform, 5-6-lobed, the lobes irregularly crenate, sometimes sub-entire, 1 to 3 in. broad. Peduncles long, slender, often clustered. Petals acute, valvate. Fruit much compressed, the 598

secondary ridges absent; pericarp thin, blackish. DC. Prodr. IV. 67; Miq. Fl. Ind. Bat. I. Pt. I, 734; Kurz in Journ. As. Soc. 1877, Pt. II. 113; Clarke in Hook fil. Fl. Br. Ind. II, 667. H. hispida, Don Prodr. 183. H. nepalensis, Hook. Exot. Fl. t. 30; Wall. Cat. 561; DC. l.c. 65; Miq. l.c. 735. H. zeylanica, DC. l.c. 67; W. & A. Prodr. 366; Miq. l.c. 734. H. hirsuta, Blume Bijd. 884. H. polycephala, W. & A. Prodr. 366; Wight. Ic. t. 1003. H. hirta, R. Br. var. acutiloba, F. Muell.; Benth. Fl. Austral. III. 340. H. Heyneana, Wall. Cat. 563. H. strigosa, Ham. in Wall. Cat. 7219.

Perak; and probably in all the other provinces except the Andaman and Nicobar Islands.—Distrib. The Malay Archipelago, Australia, Philippines.

2. Hydrocotyle asiatica, Linu. Sp. Pl. 234. Leaves rotund-reniform, the margins not lobed but uniformly crenate or dentate, sometimes sub-entire, 5 to 2 in. broad. Peduncles short, often 2 or 3 together. Petals obtuse, imbricate. Fruit compressed, secondary ridges prominent, pericarp thickened. Roxb. Hort. Beng. 31: Fl. Ind. II, 88; Wall. Cat. 560; DC. Prodr. IV, 62; W. & A. Prodr. 366; Wight Ic. t. 565; Dalz. & Gibs. Bomb. Fl. 105; Kurz in Journ. As. Soc. 1877, Pt. II, 113; Clarke in Hook. fil. Fl. Br. Ind. II, 669. H. Wightiana, Wall. Cat. 7220. H. lurida, Hance in Walp. Ann. II, 690.—Rheede Hort. Mal. X. t. 46.

Andaman Islands; Perak.—Distrib. Tropical and sub-tropical regions.

## 2. ERYNGIUM, Linn.

Spinescent, glabrous, erect, perennial herbs (the Indian species). Leaves spinous-toothed, entire lobed or dissected. Flowers in simple heads, each bracteolate; bracts whorled, spinulose (in Indian species). Calyx-tube covered with ascending hyaline scales; teeth rigid, acute. Petals whitish, narrow, erect, emarginate, scarcely imbricate. Fruit ellipsoid, nearly cylindric: carpels dorsally subcompressed, subconcave on the inner face; primary ridges obtuse not prominent, secondary 0; vittæ in the primary ridges inconspicuous or 0, with some very slender scattered in the endocarp: carpophore 0. Seed semi-terete, dorsally subcompressed, subconcave on the inner face.—Distrib. Species 100, temperate and tropical; plentiful in Western Asia.

ERYNGIUM FETIDUM, Linn. Sp. Pl. 232, (in part.) Erect, unbranched below, dichotomously branched above. Leaves radical, oblong-oblanceolate, coarsely serrate, glabrous, 4 to 9 in. long and not more than 1 in. broad. Bracts of inflorescence all spinous-toothed; the lower deeply lobed; the upper smaller (about 1 in. long), lanceolate, not

lobed, whorled. Flowers in dense cylindric spikes, less than 1 in. long DC. Prodr. IV, 94.

SINGAPORE: King's Collector 333.

#### Order LVII. CORNACEÆ.

Shrubs or trees. Leaves opposite or alternate, more or less coriaceous, usually petiolate, entire, rarely serrate or lobed, often unequal at the base, exstipulate. Flowers usually small, regular, hermaphrodite or unisexual, in axillary or terminal cymes, panicles or capitules. Calyx-tube adherent to the ovary; the limb truncate or 4-5-toothed or lobed, valvate or imbricate, persistent at the apex of the fruit. Petals 4-5, sometimes as many as 20, or none, valvate or imbricate. Stamens inserted with the petals and equal to them in number, rarely 2 or 3 times as many. Ovary inferior, 1-4-celled, crowned by a large fleshy or rarely small disc. Style single, long or short; stigma truncate, capitate or pyramidal, sometimes lobed. Ocules solitary in each cell (rarely 2), pendulous from the apex. Fruit baccate, (the pulp often scanty), usually 1-celled, sometimes as many as 4-celled. Seed oblong, pendulous, with copious fleshy albumen; embryo axile minute or often large with flat leafy cotyledons.—Distrib. Species about 90, widely scattered but most abundant in the temperate regions of the Northern Hemisphere.

Flowers hermaphrodite :-

Flowers unisexual

Petals not larger than the lobes of the calyx; anthers short, ovate and cordate; style short

1. MASTIXIA.

Petals much longer than the lobes of the calyx; anthers long, linear; style elongate ...

... 2. ALANGIUM. ... 3. NYSSA.

# 1. Mastixia, Blume.

Trees, young parts more or less pubescent. Leaves alternate or opposite, petioled, entire. Flowers hermaphrodite, often 2-bracteolate, small, in terminal many-flowered cymose panicles; bracts small or lengthened, pedicels short or 0, jointed under the flower. Calyx-tube campanulate, pubescent or silky; limb 5-4-toothed. Petals 5-4, ovate, leathery, valvate, pubescent, silky. Stamens 5-4; anthers cordate-oblong. Ovary 1-celled; disc fleshy; style cylindric, simple; ovule 1, pendulous from one side of the cell very near its summit. Drupe ellipsoid or ovoid, crowned by the calyx-teeth or a scar; putamen grooved down one face; endocarp protruded inwards down one side. Seed ellipsoid; albumen fleshy; embryo small, radicle elongate, cotyledons thin, elliptic.—DISTRIB. Species 18; S. India and Malaya.

Leaves alternate; bracts of the inflorescence dimorphous 1. M. bracteata. Leaves alternate or opposite:—

Bracts of the inflorescence all small, triangular, con-

cave, puberulous, not in whorls ... 2. M. Scortechinii.

Bracts of inflorescence in whorls at the base of the

flower-pedicels, broad ... ... 3. M. gracilis.

Leaves opposite:-

Flowers 5-merous ... ... ... 4. M. Maingayi.

Flowers 4-merous ... ... 5. M. Clarkeana.

MASTIXIA BRACTEATA, Clarke in Hook. fil. Fl. Br. Ind. II, 746. A tree 40 or 50 feet high: young branches slender, glabrous. Leaves alternate, thinly coriaceous, olivaceous-green when dry, abruptly bluntly and shortly acuminate, the base cuneate; both surfaces glabrous, the lower faintly reticulate; main-nerves 5 or 6 pairs, ascending, curved, impressed on the upper but prominent on the lower surface; length 1.75 to 3 in.; breadth .75 to 1.35 in.; petiole .25 to .5 in. Cymes terminal, '75 to 1.5 in. long, branching, many-flowered, bracteate; the bracts of two sorts; those at the bases of the branches linear-oblong. blunt, 1-nerved, glabrous, longer than the flowers; those at the bases of the flowers much smaller, lanceolate, puberulous. Flowers a little over 1 in. long. Calyx funnel-shaped, the tube adpressed-silky outside; the mouth expanded, glabrous, wavy but scarcely distinctly toothed, Corolla hemispheric in bud: petals adnate by their edges, broadly ovate, silky externally. Anthers 5, broadly ovate, cordate at the base; filaments short. Disc large, fleshy, 5-toothed, each tooth with an oblong depression in the middle. Style short, grooved. Fruit unknown.

MALACCA: Maingay (K.D.) 710. PERAK: Kunstler 6830.

2. Mastixia Scortechini, King n. sp. A small tree; young branches slender, angled, glabrous. Leaves coriaceous, elliptic-oblong or oblanceolate, much attenuate to the base, the apex shortly and bluntly acuminate; both surfaces glabrous, pale olivaceous when dry, the lower the palest; main-nerves 4 or 5 pairs, ascending, slender; length 1.75 to 2.5 in.; breadth .85 to 1.25 in.; petiole .25 to .5 in. Cymes corymbose, terminal, several together, 1.25 to 1.75 in. long, puberulous; the branches short, angled; bracts at the bases of the branches and of the flowers similar, small, triangular, concave, puberulous. Flowers sessile; calyx-tube narrowly campanulate, the mouth with 5 distinct triangular teeth. Corolla depressed-globose in bud. Petals 5, puberulous outside, ovate, acute. Stamens 5: anthers broadly ovate, cordate at the base: filaments short. Disc fleshy, cushion-like, with 5 short lobes. Ovary 1-celled; style short, grooved, stigma peltate. Fruit unknown. M. bracteata Scortechini MSS. (not of Clarke).

PERAK: Scortechini 1971.

This much resembles a leaf specimen issued by Koorders and Valeton (No. 914) from Herb. Buitenzorg as M. trichotoma, Bl. I have not seen Blume's type of this species. But in his Bijdragen he describes its flowers as tetramerous. A Sumatra specimen collected by Beccari (P.S. 956) which has ripe fruit but no flowers probably belong to this. These fruits are narrowly oblong, tapering to each end, smooth, slightly over an inch in length and about '35 in. in diam. (when dry). M. Scortechinii much resembles M. bracteata, Clarke; but differs in having bold acute calyx-teeth, and only one kind of bracts on the inflorescence.

3. Mastixia gracilis, King n. sp. A small tree; young branches slender, angled, smooth, yellowish. Leaves thinly coriaceous, lanceolate, tapering much to the base and still more to the much acuminate apex; both surfaces pale olivaceous-green when dry, glabrous; the upper shining, the lower somewhat dull; main-nerves 8 to 14 pairs, ascending, very little curved, faint on both surfaces; length 2.25 to 4.5 in.; breadth 8 to 1.5 in.; petioles varying from 2 to 25 in. Cymes in threes, terminal, about a third or a fourth the length of the leaves, on short angled peduncles, the branches short and crowded at their apices, many-flowered, with a whorl of minute broad bracts at the base of flower pedicels. Flowers about '1 in. long, their pedicels about as long, ovoid. Calyx campanulate; the tube puberulous, slightly furrowed; the mouth wavy, indistinctly 5-toothed. Petals 5, oblong-ovate, adherent by their edges, concave, leathery. Stamens 5; anthers oblong, bifid: filaments short. Disc small. Style short, conical: stigma concave. Fruit unknown.

Perak: at an elevation of about 5,000 feet; Wray 1528.

4. Mastixia Maingayi, Clarke in Hook. fil. Fl. Br. Ind. II, 746. A tall tree; young branches, petioles, under surfaces of leaves, branches and bracts of the inflorescence and the outer surfaces of the calyx and petals densely and softly rusty-tomentose. Leaves opposite, coriaceous, elliptic or elliptic-ovate, the apex shortly and abruptly acuminate, the base cuneate; upper surface glabrous, greenish when dry, the midrib and nerves impressed; the tomentum on the lower surface pale brown; main-nerves 6 to 8 pairs, ascending, curved, very prominent on the lower surface and connecting nerves transverse; length 4 to 6 in.; breadth 1.5 to 3 in.; petioles unequal, .75 to 1 in. Cymes branched, on peduncles 1'5 to 2 in. long, terminal, longer than the leaves; the bracts at the bases of the branches small, oblong. Flowers numerous, 15 in. long. Calyx campanulate, deeply 4-lobed; the lobes broadly ovate, obtuse. Petals 4, similar in shape to the sepals but smaller, concave, aduate by their edges. Stamens 4, inserted on a thick fleshy cushion-like circular disc by short filaments; anthers short, broadly ovate, cordate, introrse. Ovary one-celled, crowned by the fleshy disc. Fruit ellipsaid, not compressed, attenuate towards the apex, smooth, 1.2 in. long and 6 in. in diam.

MALACCA: Maingay (K.D.) 711. SINGAPORE: T. Anderson, Kurz.

VAR. sub-tomentosa, King. The tomentum minute, the panicles somewhat shorter, otherwise as in the typical form. M. Junghuhniana, Clarke not of Miq. in Hook. fil. Fl. Br. Ind. II, 746.

SINGAPORE: Ridley 6293, 6340. PENANG: Curtis 1564. MALACCA: Maingay (K.D.) 709.

5. Mastixia Clarkeana, King n. sp. A tree 40 to 60 feet high; young branches slender, striate, glabrous. Leaves opposite, thinly coriaceous, oblong or oblong-lanceolate, narrowed to the rounded or sub-acute base; the apex rather abruptly and somewhat bluntly acuminate; both surfaces glabrous, the upper pale olivaceous-green, the lower dull, pale brownish when dry; main-nerves 5 to 6 or 7 pairs, ascending, slightly curved, impressed on the upper surface, prominent on the lower; length 3 to 4 in.; breadth 1 to 1.35 in.; petiole .3 to .35 in. Cymes terminal, nearly as long as (or sometimes longer than) the leaves, pedunculate, with rather numerous many-flowered angular puberulous branches: bracteoles minute, opposite in pairs, lanceolate or ovate, concave. Flowers 'l in. long, sessile. Calya funnel-shaped, pubescent outside, the month with 4 deep broadly ovate teeth. Corolla depressed-globular in bud. Petals 4, nearly as long as the calyx-teeth, ovate-rotund, concave. Stamens 4: anthers short, ovate-rotund, filaments short. Disc fleshy, 4-lobed. Style short, compressed. Stigma concave. Fruit unknown.

PERAK: Scortechini 98, 625, 869; King's Collector 10861.

VAR. macrophylla, King. Leaves ovate-elliptic, shortly acuminate; main nerves 7 pairs: flowers as in the typical form.

PERAK: Scortechini 10575.

There are in Herb. Cal. specimens belonging to four distinct species of *Mastiza* which are too imperfect to be named, and which I have been unable to match with any already described species. These are as follows:—

- (a). Two gatherings (Wray 1234 and King's Collector 2907) of a plant collected a tan elevation of from 3000 to 3400 feet in Perak which is evidently a Mastixia. In their leaves these resemble M. Maingayi, Clarke, var. sub-tomentosa, King; but the under surfaces are more glabrous and the main-nerves are rather more oblique than in that plant; the young branches are moreover of a dark colour and almost glabrous, while those of M. Maingayi are pale and rufescently tomentose. These specimens are in fruit, and none of them has a single flower. The fruit is narrowly ellipsoid, attenuate gradually to the apex, smooth, 1.2 in. long, and .4 in. in diam. While the leaves suggest a relationship to M. Maingayi, the remains of the calyxlobes at the apex of the fruit, which are 4-lobed, suggest perhaps a still closer affinity to the tetramerous species M. Clarkeana, King.
  - (b). A specimen from Penang (Herb. Curtis 919) which is in fruit only.
- (c). Specimens of a tetramerous species (in fruit only) from the Andamans with leaves otherwise like those of M. pentandra, Bl., but obscurely serrate.

(d). Two specimens collected by Mr. Wray at an elevation of 6,700 feet in Perak. These are in fruit; their leaves resemble those of M. gracilis, King, but have the main-nerves fewer but bolder.

## 2. Alangium, Lamk.

Shrubs or trees. Leaves alternate, petiolate, entire, persistent. Flowers in axillary fascicles or short cymes, hermaphrodite, hairy, jointed on their pedicels; bracts small or 0. Calyx-tube adnate to the ovary, the limb toothed or truncate. Petals 5 or 6 (rarely more), linear-oblong, valvate, sometimes becoming reflexed. Stamens equal in number to or twice as many as the petals or more; the anthers, long, inear; the filaments short compressed, often hairy. Ovary inferior, 1- to 3-celled, or 1-celled at the apex and 2- to 3-celled at the base, surmounted by a fleshy disc: style very long often clavate; stigma large, capitate or pyramidal; orule pendulous. Fruit a berry, often with very scanty pulp, crowned by the slightly enlarged calyx. Seed oblong, compressed; albumen fleshy, sometimes ruminate; cotyledons leafy, flat or crumpled: radicle long or short.—Distrib. About 16 species, in tropical and sub-tropical Asia and Africa, Australia, Polynesia.

Stamens (in Malayan specimens) more than 6 (usually 15 to 20): fruit only slightly compressed .. 1. A. Lamarckii. Stamens 5 or 6; fruit much compressed :-Leaves oblique, membranous:-Cymes on comparatively long peduncles, much-branched, many-flowered ... 2. A unilorulare. Leaves not oblique, corinceous :-Cymes on short peduncles; flowers 6 to 12, shortly pedicelled and 'I in. in diam.; leaves glabrous above and minutely scaly underneath 3. A. ebenaceum. Cymes sessile, 3- to 5-flowered; flowers 25 in in diam.; leaves glabrous on both surfaces 4. A. Ridleyi. Cymes on very short peduncles, 4- to 8-flowered: flowers 1 in. in diam.; leaves tomentose or pubescent on lower surface ... 5. A. nobile.

1. Alangum Lamarckii, Thwaites Enum. Pl. Ceyl. 133 A shrub or small tree. Leaves variable in form and size, those of the Malayan specimens oblong-elliptic, elliptic to elliptic-ovate or ovate-rotund, the base rounded or slightly cordate, the apex with a short blunt apiculus; upper surface glabrous or nearly so, the lower with a few scattered hairs; main-nerves 4 or 5 pairs, reticulations distinct; length 3 to 6 in.; breadth 2 to 3.5 in; petiole 2 to 3 in. Flowers in short dense fascicles of 4 to 8, about 75 in. long; peduncles, pedicels and outside of calyx rusty-tomentose. Calyx cupular, slightly 6-toothed. Petals lanceolate,

sub-acute, externally hairy, inside glabrous but with a hairy mesial line. Stamens about 18, two opposite each petal and one opposite each sepal, free; filaments slender pilose; anthers linear reaching almost to the apices of the petals. Disc annular, wavy. Style as long as the stamens, 6-grooved; stigma 3-lobed. Fruit ellipsoid, slightly compressed, contracted below the disc-bearing mouth, densely and minutely tomentose, '75 to 1 in. long and '65 in. in diam. Dalz. & Gibs. Fl. Bombay 109; Brandis For. Fl. N.-W. India 250; Clarke in Hook. fil. Fl. Br. Ind. II, 741; Trimen Fl. Ceylon I, 285. A. decapetalum, Lamk. Dict. I, t. 174; DC. Prodr. III, 203; Wall. Cat. 6884; W. & A. Prodr. 325; Wight Ic. t 194 Mig. Fl. Ind. Bat. I, Pt. I, 774; Kurz For. Fl. I, 543. A. hexapetalum, Lamk. and DC. II. c.: Roxb. Hort. Beng. 38, Fl. Ind. II, 502; Wall. Cat. 6883; W. & A. Prodr. 326; Wight Ill. t. 96. A. sundanum, Mig. Fl. Ind. Bat. I, Pt. I, 774; Kurz. l.c. A. tomentosum, Lamk. and DC. II. c.; Wall. Cat. 6885. A. latifolium, Miq. in Pl. Hohenack. No. 719.—Rheede Hort. Mal. IV, tt. 17, 26.

PERAK: Scortechini; King's Collector 5590. SINGAPORE; Ridley 6020.—DISTRIB. Brit. India, Malayan Archipelago, S. China, Philippines, East Africa.

Var. glandulosa, Clarke in Hook. fil. Fl. Br. Ind. II, 742. A large climber. A. glandulosa, Thw. Enum. Pl Ceyl. 133; Trimen Fl. Ceyl. II, 286.

ANDAMAN and NICOBAR ISLANDS. DISTRIB. CEYLON.

2. Alangium uniloculare, King. A tree 30 to 60 feet high; young branches minutely rusty-pubescent, slender. Leaves membranous. obliquely ovate-lanceolate or oblong-lanceolate, acuminate, the base unequal, one side rounded the other acute, the edges somewhat wavy; upper surface glabrous except the tomentose midrib and pubescent main-nerves; the lower sparsely sub-adpressed pubescent and minutely glandular; main-nerves 4 to 6 pairs, ascending, the lower on one side much branched, all slightly prominent on both surfaces; the main-veins sub-parallel; length 3.5 to 5.5 in.; breadth 1.75 to 2.25 in.; petiole .25 to .3 in., villous. Cymes axillary, about onethird of the length of the leaves, pedunculate; the branches spreading, rusty pubescent, many-flowered. Flowers about 4 in. long, with subulate bracteoles and short pedicels. Calyx-tube funnel-shaped, not grooved, the mouth minutely toothed. Petals 5, linear; anthers linear; filaments short, broad, woolly at the apex. Style cylindric, pubescent; stigma subglobose. Fruit ovate in outline, much tapered to the apex, compressed, faintly ridged when dry, 6 in. long and 35 in. broad when dry. Marlea unilocularis, Griff. Notul. IV, 679. M. Griffithii, Clarke in Hook. fil. Fl. Br. Ind. II, 742.

Malacca: Griffith (K.D.) 3387; Maingay 708. Perak: Wray 2927, 3486; Scortechini 1914; King's Collector—many numbers.

3. ALANGUIM EBENACEUM, Griffith MSS. A tree 30 to 70 feet high; young branches rather slender, smooth, dark-coloured when dry. Leaves coriaceous, oblong, slightly acuminate, the base cuneate or rounded: upper surface glabrous, the lower with numerous minute pale scales; main-nerves 13 to 16 pairs, spreading, very slightly curved. prominent on the lower surface; length 6 to 10 in.; breadth 2.5 to 4 in.; petiole 35 to 8 in. long. Cymes from as long to twice as long as the petioles, on short peduncles, axillary, branched, 6- to 12-flowered. Flowers sessile, '65 in. long, and only '1 in. in diam. Calyx cupular slightly grooved; the mouth truncate, slightly toothed. Petals 6 (sometimes only 5), linear, minutely pubescent externally. Stamens 6 (or 5); anthers about as long as the petals, linear; filaments short compressed, woolly in front. Style cylindric-clavate, shortly hairy; stigma pyramidal. Fruit ovate in outline, compressed, faintly ridged, about I in. long and 6 in. wide. Marlea ebenacea, Clarke in Hook. fil. Fl. Br. Ind. I, 742.

Malacca: Griffith (K.D.) 3384. Maingay (K.D.) 706. Perak: Wray 3302; Scortechini 1963; King's Collector 3252, 5363, 6562, 6626.

4. Alangium Ridleyi, King. A tree; young branches covered with minute deciduous scales and hairs, rather slender. Leaves coriaceous, elliptic, sometimes slightly obovate, shortly and bluntly acuminate, the base cuneate; both surfaces glabrous; main-nerves 10 pairs spreading, slightly curved upwards, bold and prominent on the lower surface; connecting veins parallel, faint; length 6 to 8 in.; breadth 2.5 to 3.5 in.; petioles .9 to 1.3 in. Cymes as long as or rather shorter than the petioles, sessile, 3- to 5-flowered. Flowers nearly 1 in. long, 25 in. in diam. their pedicels 2 to 25 in. long, minutely velvetytomentose like the outside of the calyx and petals. Culyx campanulate, slightly furrowed, the mouth wide truncate. Petals 6, thick, grooved and minutely hairy inside, oblong-lanceolate, sub-acute. Stamens somewhat shorter than the petals; anthers narrowly linear, with a tuft of hairs at the base; filaments short flat almost glabrous. Style slender clavate; stigma deeply furrowed, disc 6-angled cushion-like, glabrous. Fruit unknown.

SINGAPORE, in the Botanic Garden Jungle, Ridley 4941.

Ridley's specimens are without fruit. Mr. Wray has sent from Perak some specimens (Herb. Wray 3632) of a plant in fruit which in spite of its considerably larger leaves (nearly a foot long), may be conspecific with this. These fruits are narrowly ellipsoid, much compressed and deeply furrowed, narrowly to the base, less so to the truncate apex. A. costata, Boerl. MSS. is the nearest ally of both.

5. Alangium nobile, Harms. A tree 60 to 100 feet high: young branches and petioles velvety rusty-tomentose. Leaves coriaceous, elliptic to ovate-elliptic, rarely slightly obovate, entire, the base slightly cordate rarely sub-acute, the apex blunt or very shortly and bluntly acuminate; upper surface almost glabrous, the midrib and nerves minutely tomentose: lower surface densely and minutely tomentose or pubescent; main-nerves 8 to 10 pairs, spreading, slightly curved, very bold on the lower surface when dry, the secondary nerves transverse and bold; length 4.5 to 12 in.; breadth 3 to 6.5 in.; petiole 8 to 1.75 in. Cymes on very short peduncles, 4- to 8-flowered, shorter or slightly longer than the petioles. Flowers 5 or 6 in. long and 1 in. in diam; their pedicels very short and thick. Calyx narrowly campanulate; deeply 6-grooved; the mouth with 6 deep lanceolate spreading teeth. Petals thick, narrowly oblong, sub-acute, tomentose, especially outside, sub-glabrous inside. Stamens 6, shorter than the petals, filaments short villous inside; anthers linear. Style cylindric, adpressed villous; stigmas linear. Disc glabrous, deeply 6-lobed. Fruit compressed, ridged, ellipsoid in outline, slightly contracted at both ends, tomentose, about 1 in. long and 65 in. broad. Marlea nobilis, Clarke in Hook. fil. Fl. Br. Ind. II, 743.

MALACCA: Griffith (K.D.) 3384, 3385. Maingay (K.D.); 705, 707. PERAK: King's Collector 6047, 6116, 10892. SINGAPORE: Maingay; Ridley 5077.

Beccari collected in Borneo specimens (Herb. Becc. P.B. 3611) of a species closely allied to this, the flowers of which are however longer (85 in.) with the calyx-tube much less prominently grooved.

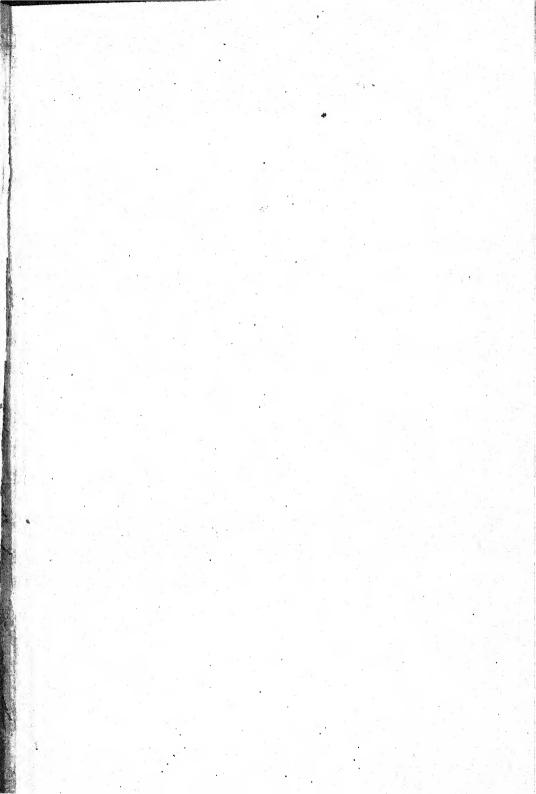
## 3. Nyssa, Linn.

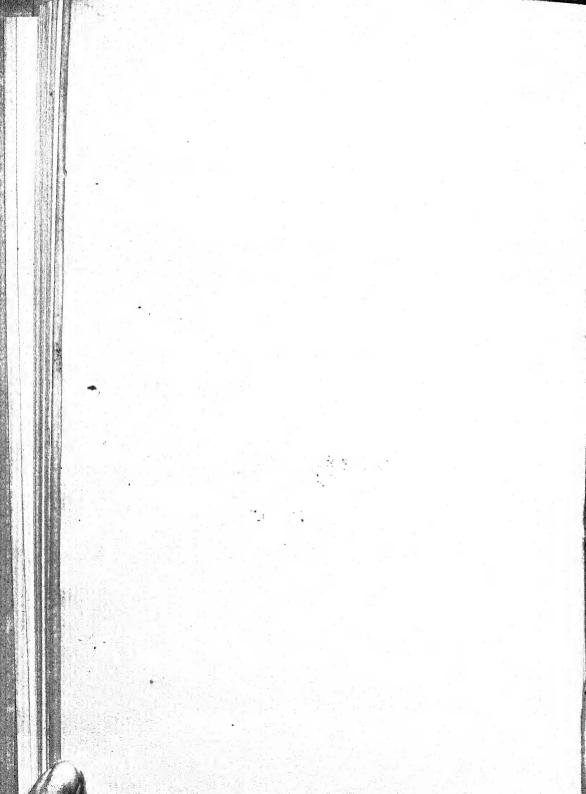
Trees (or shrubs), innovations silky. Leaves alternate, petioled, entire. Flowers capitate, on axillary peduncles, polygamo-diocious, 1 or few females and many males in a head, each 3-4-bracteolate, or the males irregularly coalescing. Male: calyx short, cup-shaped, 5-7-toothed; petals 5-7, imbricate, hairy; stamens usually 10 (in the Indian species) around a large circular disc; rudiment of the ovary 0 or small. Female: calyx-tube campanulate; limb 5-toothed; petals 0 or minute; rudimentary stamens none; ovary 1-celled; style cylindric, simple or shortly 2-fid; ovule solitary, pendulous. Berry oblong or ovoid. Albumen copious; cotyledons flat, leafy, nearly as broad as the seeds.—Distrib. Species 5-6, in N. America, and from Sikkim to Java.

NYSSA SESSILIFLORA, Hook. fil. in Gen. Plantar. I, 952. A tree. Leaves sub-coriaceous, oblanceolate or elliptic-lanceolate tapering to each end, length 4 to 8 in.; breadth 1.5 to 2.5 in.; petiole 6 to 8 in.; both surfaces minutely punctate; main-nerves 6 to 8 pairs, spreading.

Peduncles pubernlous, '5 to 1 in. long. Ripe fruit oblong-ovoid, smooth, crowned by the small circular calyx, '6 to '75 in. long when dry. Clarke in Hook. fil. Fl. Br. Ind. II, 747. Daphniphyllopsis capitata, Kurz For. Fl. I, 240; and in Journ. As. Soc. 1875, Pt. II, 201, with fig. Ilex daphniphylloides, Kurz in Journ. As. Soc. 1870, Pt. II, 72. Agathisanthes javanica, Blume Bijd. 645; Miq. Fl. Ind. Bat. I. Pt. I. 839. Ceratostachya arborea, Blume Bijd. 644; Miq. l.c.

PERAK: at elevat. of 3,400 feet, Wray.—DISTRIB. Sumatra, Forbes 2880: Beccari (P.S.) 17, 335; Java; Trop. Eastern Himalaya; Khasia Hills.





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